Causes for Gasoline & Diesel Price Increases in California

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March 28, 2003

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Executive Summary

The statewide average retail price of regular gasoline jumped 36 percent, climbing from $1.58 a gallon on January 1, 2003, to a record-setting $2.15 a gallon on March 17, 2003 — an increase of 57 cents.

With Californians consuming nearly 1.1 billion gallons of gasoline each month, a 57-cent-per-gallon increase costs consumers more than $20 million per day.

From January to mid-March 2003, diesel fuel consumers saw the price of their fuel increase by as much as 31 cents a gallon, reaching a statewide average of $1.89 a gallon on March 13, 2003.

Concerned about the impact on the state's economy and individual consumers, Governor Gray Davis asked the California Energy Commission (Energy Commission) on March 13, 2003 to examine the causes of the recent price increases.

Why have prices increased?

As long as demand for transportation fuels continues to grow, California's gasoline supply will be subject to price spikes. At maximum production, the state's refineries make more than 44 million gallons of gasoline a day. We still need to import an estimated 100 million gallons of gasoline and blend stocks each month to meet our demand. Unanticipated production difficulties or distribution problems can tighten the market and drive up prices before additional supplies can arrive by ship from distant refineries, which can take three to six weeks.

This year's increase in gasoline and diesel prices is not unlike similar events that occurred in 1999 and 2001. What primarily drove this year's increases to record-setting levels was the unusually high cost of crude oil on the world market. The price of crude oil on the world market nearly doubled in the past year due to market uncertainty about the threat of war in the Middle East. Other factors included an oil strike in Venezuela that drastically cut supplies and a cold winter in the Eastern U.S. that increased the need for heating oil.

The Energy Commission tracks the price of Alaskan North Slope oil as a benchmark of crude oil prices. On January 2, 2002, Alaskan North Slope crude sold for $18.36 a barrel. Since the beginning of 2003, Alaskan crude increased nearly $7 a barrel, setting a price record of $37.48 on March 12, 2003. The $7 increase by itself accounts for nearly 18 cents of California's higher gasoline and diesel costs.

Diesel prices in California and other national markets moved up in tandem with world crude oil prices. For that reason, increased diesel prices seem to be accounted for by more expensive crude oil and some normal, seasonal variation in price.

Higher gasoline costs, however, are not completely explained by the higher price of crude oil. Especially troubling is the fact that gasoline prices climbed quicker and higher in California than in the rest of the country.

Gasoline prices normally begin to increase around March as refiners switch from winter blends to a summer blend. Because summer gasoline contains more expensive ingredients, it typically costs 5 cents more per gallon to produce. Fuel terminals and storage facilities try to empty their large tanks of winter gasoline before switching over to summer blends, making March a time of temporarily low inventories, and leaving the market vulnerable to price increases if supplies are disrupted. Several factors, however, exacerbated the already tight supplies and contributed to price increases this year in California:

- Because consumer demand for gasoline is at a low ebb during the winter, refiners often take processing units out of service during late fall or early winter to perform major maintenance before the summer driving season begins. These so-called "turnarounds" are planned events; refiners build gasoline inventories or purchase additional supplies to get them past the time when their refineries are not producing. This year, gasoline supplies became tighter and prices increased as some of those turnarounds took longer than expected.

- It appears that Governor Davis' decision to delay the phase out of MTBE from January 2003 to January 2004 successfully forestalled prior predictions that the earlier phaseout would have create severe supply problems. The one-year delay provided refiners the flexibility to make the conversion when they believed their ethanol supplies were secure and the needed infrastructure additions like blending equipment and extra storage tanks were in place. However, the MTBE phaseout did result in a shift of independent marketer demand. As a result, primary suppliers struggled to maintain consistently adequate supplies of gasoline to these customers. This appears to have contributed to a rapid price increase for unbranded gasoline in both Northern and Southern California.

- In late February and early March, constrained gasoline supplies in Phoenix caused prices in Arizona to rise even higher than prices in California. Arizona's supply problems increased demand for gasoline exports from Southern California and likely contributed to the severity of the rise in California gasoline prices.

Speculation also contributed to price volatility. Just as the anticipation of supply interruptions in the Middle East caused crude oil prices to escalate worldwide, fear of possible blending problems with California’s new summer gasoline caused additional speculation in an already volatile gasoline market.

When gasoline supplies are tight, even the rumor of refinery problems can have major consequences in the fuels market. A mistaken report of a refinery outage in 1999, for example, caused the spot price to jump 13 cents in one afternoon. In much the same

way, this year word spread throughout the industry that California refiners were having difficulty making CARBOB gasoline that could meet new summer specifications. The trade press later reported that Shell made a test batch of CARBOB in February that did not quite meet summer specifications, but it was still usable as winter fuel. Despite this clarification, the rumor raised industry concerns.

In another case, ethanol-blending equipment malfunctioned at a San Diego fuel terminal. As a result, British Petroleum had to pump non-compliant regular gasoline out of underground tanks at 59 of its local ARCO retail outlets. This error was complicated by an isolated incident of a lone disgruntled Texaco service station owner posting gasoline prices as high as $4.29 a gallon for premium. The combination of these events led to rumors reported by the national press that stations in San Diego had inadequate supplies of gasoline and that stations were closing. It is not clear, however, how these events contributed to the price increases.

The price spikes also affected refiner and dealer cost and profit margins. As California's gasoline prices escalated in a volatile market, pump prices differed as much as 30 cents a gallon from one station to another in a single day. Obviously, some retailers were making more profit than others were. However, by using average retail and wholesale prices for regular gasoline, we can determine an approximate dealer cost and profit margin — the difference between the retail price and the wholesale cost of gasoline with applicable state, federal and local taxes included.

The seven-year average for dealer margins is approximately 10 cents per gallon. Estimates show that, in the past four weeks, average dealer cost and profit margins for both major brands and independent stations ranged from four cents to 18 cents a gallon. Cost and profit margins for retailers include such expenses as franchise fees, rents, wages, utilities, supplies, equipment maintenance, environmental fees, licenses, permitting fees, insurance, depreciation and advertising, as well as profit. For dealers, some expenses such as credit card fees increase as the retail price goes up.

During 2003, the cost and profit margins for refiners — the difference between the cost of crude oil and the wholesale price of gasoline — also increased. The seven-year average for refiner margins is between 29 and 32 cents. Since the beginning of the year, estimated refiner margins ranged from 19 cents to 76 cents a gallon for both major brands and independent gasoline.

We are unable to determine an individual company's actual costs for operating a refinery or terminal precisely — expenses such as processing crude oil, adding oxygenates, shipping and storing products, depreciation, advertising and more. However, the cost and profit margins for refiners have increased in a tight market.

The possibility exists, nevertheless, that one or more refiners could manipulate retail prices by withholding gasoline, but such behavior would pose certain risks. For one, the company could permanently lose market share if its stations ran out of fuel or charged prices substantially higher than its competitors. Increased prices might not be enough

to compensate for the loss in sales volume, and if discovered, such manipulation would cause a public relations backlash that could seriously damage the company's credibility.

The Energy Commission has been examining options to help stabilize our volatile market, ensure we have adequate gasoline and diesel supplies and minimize our State's dependency on petroleum. As required by Assembly Bill 2076, our study with the California Air Resources Board will explore ways to increase transportation energy efficiency and encourage the development of alternative fuels and vehicles. At the same time, the Energy Commission is examining strategies to address short-term price volatility. These strategies included the feasibility to develop a strategic fuels reserve and other options to insulate California consumers and businesses from substantial short term price increases arising from refinery outages and other supply disruptions. We plan to submit the final report to the Legislature in June 2003.

In the past two weeks, with the certainty of war, Alaskan North Slope crude oil prices have fallen more than $9 a barrel on the world market to $28.27 a barrel — down from its March 12, 2003 high of $37.48 per barrel. As more California refiners have come out of turnaround and the supply of gasoline has increased, the spot market wholesale price of California Reformulated Gasoline Blendstocks for Oxygenate Blending (CARBOB) has dropped more than 40 cents —from the March 12, 2003 high of $1.57 to $1.15 on March 26, 2003. As a result, prices for consumers at the pump are beginning to inch downward.

Report Recommendations

1) The Energy Commission has found no evidence that distribution problems or delays in coming out of turnaround were intentionally planned to manipulate gasoline prices. The nature of the petroleum market, however, has changed significantly in the past decade. To make our analysis of the current market conclusive, the Energy Commission needs to receive additional information on a weekly basis from oil producers, refiners, marketers, transporters, and storage facility operators. The Energy Commission must be able to track inventory levels at terminals better as well as imports and exports of petroleum products. Because of the potential for significant impacts on consumers, we recommend the petroleum industry voluntarily submit requested information now before the Energy Commission concludes its formal adoption process for collecting this data.

2) An investigation by the Attorney General does not appear warranted at this time, however, the Energy Commission will continue to monitor gasoline and diesel supplies and prices closely.

I. Background

Presented below is a brief summary of California diesel and gasoline prices over the past three months, followed by a discussion of some of the more significant trends in California gasoline over the past several years.

Recent California Diesel Fuel Prices

Since January 1, 2003 diesel fuel prices in California and across the nation increased in tandem with world crude oil prices. Figure 1 shows a comparison between California retail diesel prices and U.S. averages through March 17, 2003. California's retail diesel prices are slightly higher than U.S. averages due to tighter emissions requirements and higher taxes.

Figure 1

Retail Diesel Prices - California vs. U.S.
January, 2003 - Present

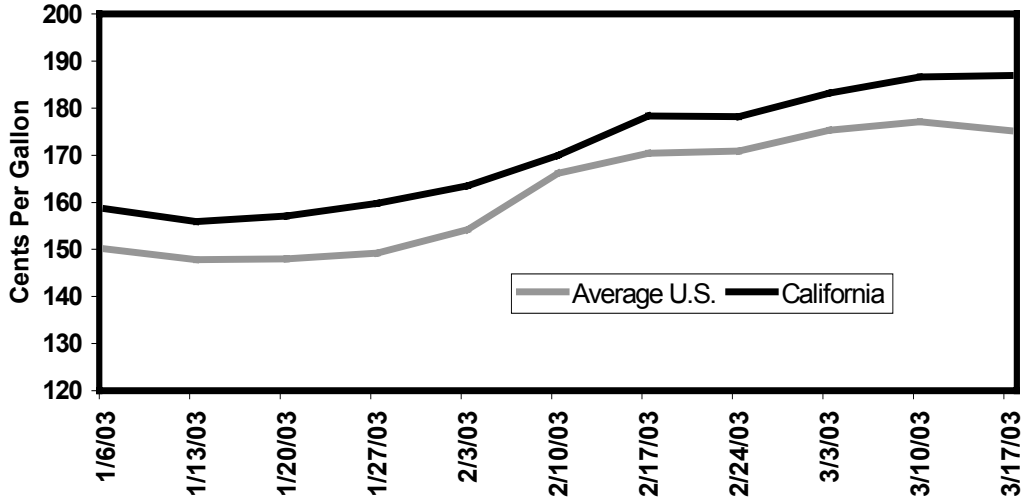
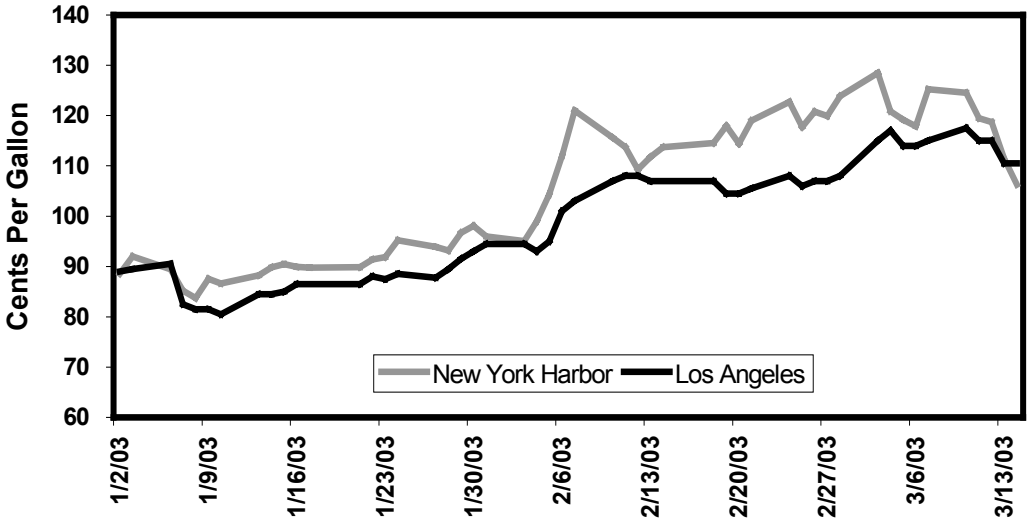


Figure 2 provides a comparison of wholesale diesel fuel prices between Los Angeles and New York over the same timeframe as Figure 1. New York prices have tended to be a little higher than Los Angeles prices due to the higher demand for distillates in the East brought about by the unusually cold winter.

Overall, California diesel fuel prices appear to be consistent with diesel prices elsewhere in the U.S.

Figure 2

Wholesale Diesel Prices - Los Angeles vs. New York
January, 2003 - Present

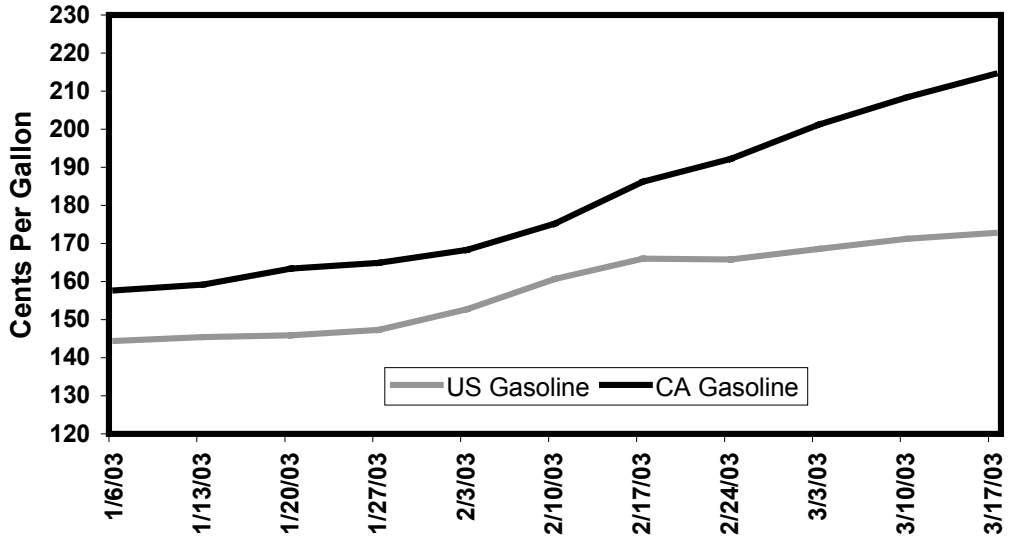


Recent California Gasoline Prices

Since, January 1, 2003 retail gasoline prices across the U.S. have been rising at a pace not seen since the 1991 Gulf War. Average U.S. retail prices rose from $1.44 to $1.73 per gallon in ten short weeks. At the same time, California gasoline prices rose even more precipitously, from $1.58 a gallon on January 1, to a record setting $2.15 a gallon on March 17 as displayed in Figure 3.

Figure 3

Retail Gasoline Prices - California RFG vs. U.S. All Formulations
January, 2003 - Present



Historical California Gasoline Prices

Rising retail prices during early spring are not unusual in California. Figure 4 shows average monthly prices for California gasoline from 1997 to 2002. In 1999 and 2001, significant refinery problems occurred that tended to exaggerate this seasonal price effect, so these two years were dropped from the averages[1]. Figure 4 identifies that a 15-cent per gallon retail price increase during late winter to early spring is typical.

[1] Multiple refinery outages caused severe shortages in 1999, and blending problem contributed to significantly higher prices in 2001.

Figure 4

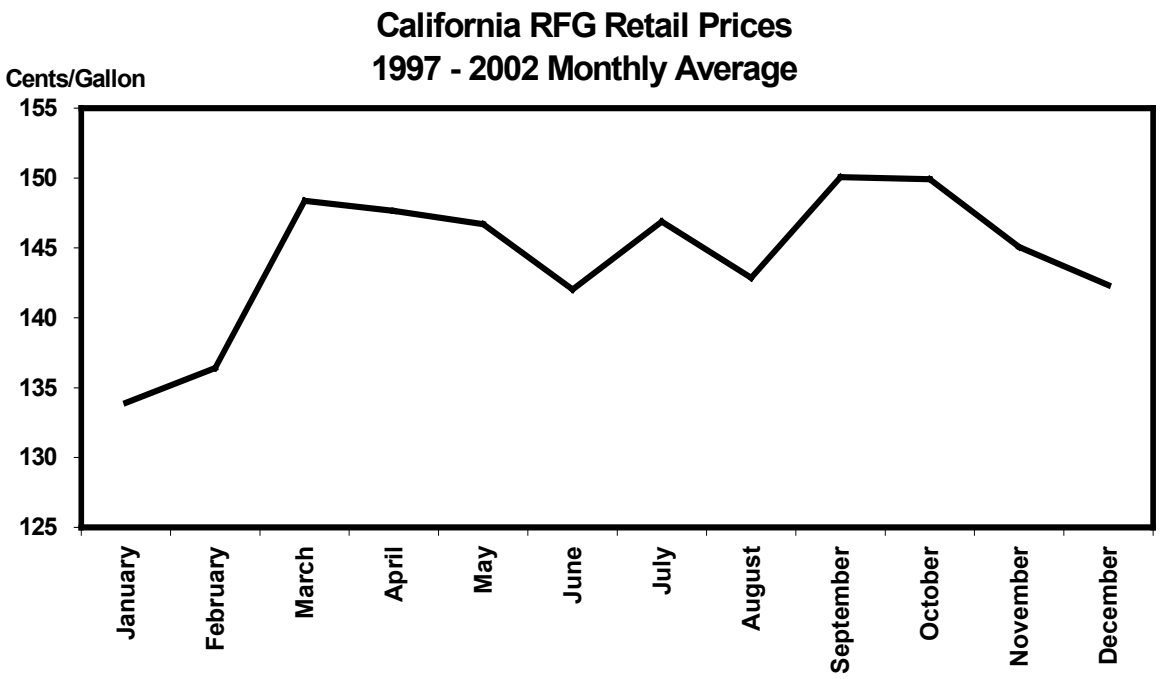
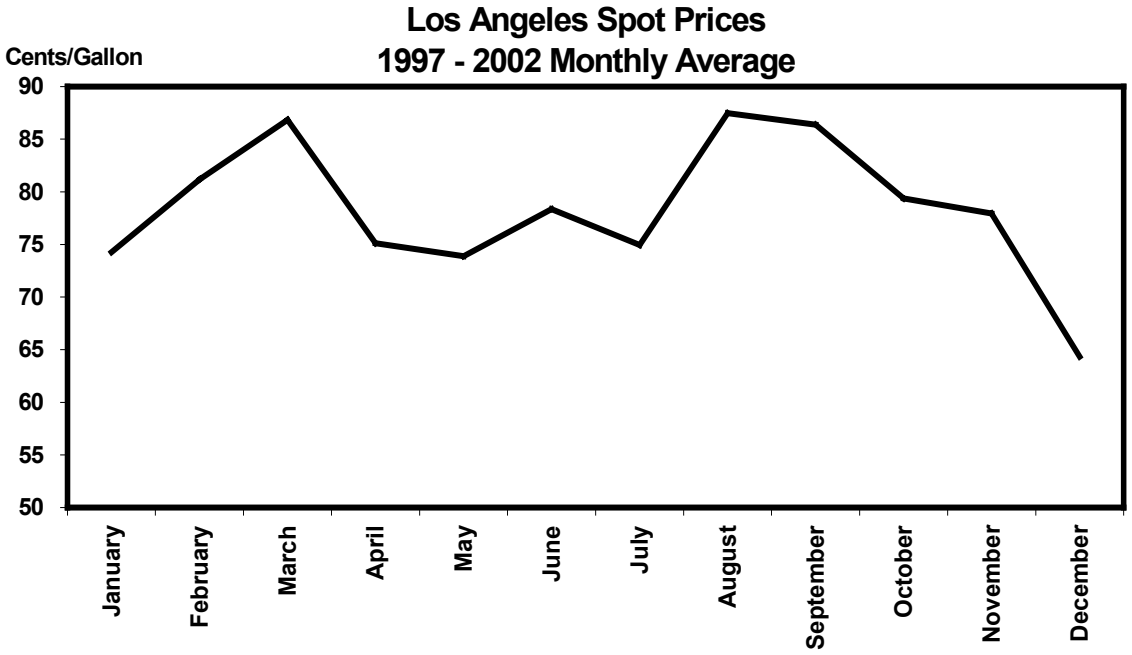


Figure 5 contains monthly average wholesale prices for California gasoline. Again, the extraordinary data from 1999 and 2001 have been removed from the averages. At the wholesale level the average increase in prices between January and March is 13 cents. These costs increases include the costs associated with importing gasoline from regions outside of California (commonly referred to as import parity[2]), as well as increased costs of blending summer gasoline.

[2] *Import parity* is defined as the level to which prices must rise in one market to attract imports from another market. For California Reformulated Gasoline (CaRFG) gasoline in California, import parity includes both the shipping costs from out-of-state (8 to 15 cents) and the differential cost of producing cleaner-burning CaRFG gasoline (5 cents). For example, during large, unplanned refinery outages in the recent past, import parity alone accounted for up to 20 cents of the increase in California gasoline prices.

Figure 5



California Supply, Demand, and Price Volatility

At the outset, it is important to make a clear distinction between the cost of producing a gallon of gasoline and the ultimate price in the marketplace for that same gallon. If the market is competitive, prices will equal the actual production and distribution costs plus a fair profit margin for refiners, distributors, and retailers. As in all other volatile commodity markets, however, this relationship will only hold on average. More often than not, the price of gasoline will either be above or below the actual costs of production and distribution.

Efficient markets require that market supply equals market demand. When occasional unanticipated supply shocks or demand shocks disrupt this equilibrium, prices rise or fall as a signal to producers to adjust production. This equilibrium is true irrespective of the actual production costs.

Supply shocks unique to California are most often caused by unexpected refinery disruptions or delays in refinery turnarounds. Under these scenarios, petroleum product production falls short of expectations. Prices rise to ration the limited supplies, and to provide an incentive to industry to increase out-of-state sources of supply.

Alternatively, California's petroleum industry sometimes over-produces to build-up inventories in anticipation of refinery outages that do not occur. This was the case for much of 1998 and 2002. During these years, California's refiners occasionally sold gasoline at prices below apparent production costs.

Finally, demand shocks can also impact market prices. This occurred just recently in Arizona. Arizona buys gasoline from refineries in both Texas and California. Refinery problems in Texas resulted in reduced supply of gasoline to Arizona. As a result, Arizona's demand for California gasoline increased significantly. This caused additional upward pressure on gasoline prices in Southern California.

Since 1996, California petroleum production capacity has remained relatively constant,[3] while consumer demand has grown steadily. California must now import refined products during high use periods to meet demand. Since no new refineries are planned in California in the foreseeable future, California will continue to become increasingly reliant on out-of-state refiners to supply gasoline or gasoline blendstocks which must be refined to California's unique clean air fuel specification standard.

The most recent Energy Commission forecast[4] projects on-road gasoline demand to increase from 14.2 billion gallons in 2000 to almost 20 billion gallons by 2020, an average annual rate of 1.6 percent. Gasoline demand growth in 2002 was actually significantly higher than projected, due in part to a reduction in air travel as a result of the events of September 11, 2001. Diesel demand is projected to grow by an average rate of 2.4 percent per year, from 2.6 billion gallons in 2000 to 4.2 billion gallons by 2020.

Faced with limited supply and growing demand, California will continue to be at risk of supply disruptions with associated price spikes. Since 1996, unplanned refinery outages have often had an immediate upward impact on prices of gasoline, especially when product inventories are low.

It is not yet known to what extent gasoline consumption has been affected by the most recent price increases since gasoline sales estimates from the California Board of Equalization for February and March are not yet available. The demand for gasoline in California is not very responsive to price (at least in the short run), due to the lack of viable alternatives to gasoline vehicles. Therefore, the impact of the recently high gasoline prices on gasoline demand has likely not been significant.

[3] There has been some slow growth in California refining capacity since 1996 -of about 1.5% per year on average. During major turnarounds, refiners can sometimes expand refinery capacity marginally through maintenance upgrades and general debottlenecking. The industry refers to this type of growth as "capacity creep."

[4] *Base Case Forecast of California Transportation Energy Demand*, December 2001 (California Energy Commission, P600-01-019)

Petroleum Industry Information

California's gasoline and petroleum products markets remain volatile. Not only is the market complex, but it is also difficult to explain and pinpoint all the reasons causing prices to rise. Currently, the Energy Commission does not collect key data and information from producers, refiners, marketers, transporters, and storers of petroleum and petroleum products that could provide the basis for identifying and responding to supply disruptions and shortfalls.

Over the past decade, the nature of petroleum markets in California has changed significantly due to more stringent air quality standards, and more recently, the transition from MTBE to ethanol use in gasoline. As a result of these changes, the Energy Commission's existing data-collection efforts need to be broadened to include the collection of new inventory data at terminals, including the imports and exports of petroleum products. Without such information, it is difficult to estimate supply/demand balances for the state and to explain price volatility in gasoline and diesel markets.

Additionally, the rapid changes recently witnessed in rising gasoline and diesel prices illustrate the need for the Energy Commission to collect certain data on a weekly basis to monitor the industry more carefully.

In response to Senate Bill 1962 (Chapter 288, Statutes 2000), the Energy Commission initiated a rulemaking process to obtain additional information from the petroleum industry to improve the state's ability to assess and respond to petroleum issues accurately. The Energy Commission developed and provided new forms for collecting key data to industry for their review and comment. Due to the urgency of California's volatile petroleum market, the petroleum industry should voluntarily submit requested information now before the formal adoption process is concluded in late 2003 or early 2004.

Historical Costs of Producing CaRFG Gasoline

Prior to 1996, California gasoline prices were similar to gasoline prices elsewhere in the U.S.[5] Since 1996, however, the Air Resources Board (ARB) Phase 2 reformulated gasoline (CaRFG 2) regulations have required California refiners to produce a special clean-burning gasoline known as CaRFG. The ARB standards are more rigorous than EPA's setting precise specifications for eight fuel parameters. Due to the higher production costs of this unique blend, California gasoline prices have generally been higher than average U.S. prices since 1996.[6]

Prior to the implementation of CaRFG gasoline, the ARB estimated the total increase in production cost would be between 5 and 15 cents per gallon. The ARB staff estimated

[5] See the Attorney Generals *Report on Gasoline Pricing in California* (May 2000).
[6] This is after adjusting for tax differences between California and the rest of the U.S. See pg. 41 of the AG's May 2000 report.

that capital investment upgrades would cost between 0 and 10 cents per gallon depending on the specific refinery.[7] The variable production costs for the new blend were estimated to be another 5 cents per gallon. Of these two different types of costs, fixed costs and variable costs, only the variable costs are expected to "pass through" to wholesale and retail prices.[8]

It is difficult to identify the extent to which ARB's original variable cost estimate of 5 cents per gallon has been realized in wholesale and retail prices due to constantly fluctuating market forces. But, since the inception of CaRFG2 gasoline, it is possible to identify those periods where the market is relatively stable, and the estimate of 5 cents per gallon appears to be correct during periods when the market is relatively stable.

Additional Costs of Importing Gasoline

California has historically been a net exporter of gasoline and other petroleum products. But in-state demand for both gasoline and diesel fuel has been steadily rising over time while in-state refining capacity has increased only marginally in recent years. To meet growing demand, California's petroleum industry has needed to import finished gasoline blendstocks from out-of-state sources occasionally.

Since 1995, California refiners have imported significant gasoline blendstocks such as MTBE. By 1996, about 8% of California's gasoline was imported as MTBE. But more recently, in the face of steadily increasing demand, refiners have been importing gasoline products, other than MTBE, more frequently as in-state production is already at full capacity. With the current transition to ethanol, California will lose approximately 1 to 2 percent of its gasoline producing capacity.[9] To make up for this shortfall, California's petroleum industry will likely be importing additional gasoline on a regular basis for the indefinite future.

When California refiners import gasoline from out-of-state, they incur additional shipping costs on top of all other production and distribution costs. These shipping costs can vary from about 8 cents to as much as 15 cents per gallon depending on the geographic source and type of tanker used. California refiners prefer to import gasoline product from foreign sources such as the Virgin Islands or New Brunswick, Canada to avoid the added costs associated with using Jones Act vessels.[10] By importing from foreign sources, refiners can keep transportation costs down around 8-cents per gallon. The

[7] Some refineries required few or no improvements to begin making CaRFG2 gasoline, while other refineries required extensive upgrades. The ARB estimated industry wide upgrade costs to be $4 billion.
[8] The fixed cost of plant and equipment are "sunk" costs in economist's jargon, and are not relevant to the short-run cost function which (in conjunction with short run demand) determine spot and retail prices. See (Baumol, et al., 1982), or (Sutton, 1991), for example.
[9] See section 4.1.2
[10] The Jones Act refers to a federal law that stipulates all marine movements of goods or passengers from one domestic port to another must be on a vessel that is constructed in a United States shipyard, owned by a US company, manned by a US crew and registered as a US flagship.

other alternative is to import from domestic sources such as the Gulf Coast using Jones Act tankers. Product arrives to California sooner under this alternative (about 3 weeks from the Gulf Coast to Los Angeles[11]) but the shipping costs will be twice as high, at about 15 cents per gallon. Domestic shipping rates are expected to increase over the near-term due to higher demands for imports and a declining fleet of Jones Act product tankers.[12]

[11] California Energy Commission, "Marine Product Tanker Fundamentals, Economics & Outlook", Consultant Report. March 2002.

[12] The Oil Pollution Prevention Act of 1990 (OPA 90) mandates that all crude oil and petroleum product tankers arriving at US ports are equipped with double-hull construction by 2015. Only 13 Jones Act product tankers (out of the current fleet of 66) comply with this standard or are exempt. Thirty-six other vessels are scheduled to be retired over the next 12 years. Since only 2 new product tankers are planned and demand for imports in California are increasing, domestic shipping rates are expected to increase over the near-term.

II. Contributing National and Worldwide Market Forces

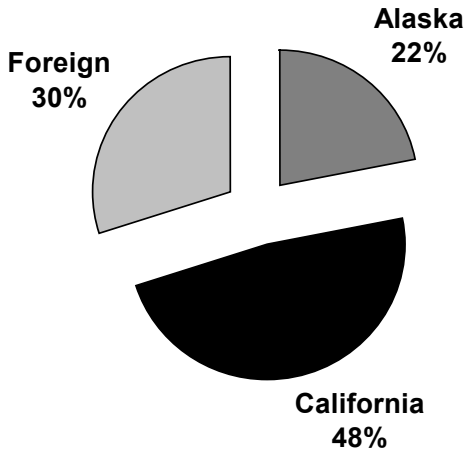
World Oil Prices

In 2002, California refineries were dependent on in-state sources for 48 percent of their crude oil supply. Alaska accounted for 22 percent, and foreign sources for 30 percent (see Figure 6 below). Regardless of the source of crude oil, prices from all these sources tended to rise and fall together, the differences in price taking into account premiums for the differences in quality.

World oil prices rose dramatically over the last year for a variety of reasons. For instance, the price of Alaska North Slope (ANS) crude oil delivered to the West Coast increased from $22.65 per barrel on March 12, 2002 to a high of $37.48 per barrel on March 12, 2003. This equals an increase of 35.3 cents per gallon in the price of an important crude oil used in California refineries.

Figure 6

Sources of Crude Oil for California Refineries
2002



Over much of the last year, the primary reason for higher crude oil prices has been the potential for supply disruptions resulting from a war in Iraq. Other events have also contributed to higher crude oil prices. In December 2002, a

nationwide strike by employees of *Petroleos de Venezuela* (*PDVSA*) significantly reduced production of crude oil and petroleum products. The shutdown of oil production and marine loading of oil caused a substantial impact on world oil markets. This effect has been estimated at as much as $5 per barrel, although segregating the impacts of the strike from the uncertainty over Iraq and other factors is highly problematic.

Other international developments have also contributed to rising crude oil prices. During late 2002 and early 2003, Japanese electric utilities made substantial unexpected purchases of petroleum fuels for power generation because of fuel switching away from nuclear facilities idled due to safety concerns. These fuels included propane, liquefied natural gas, and Indonesian waxy light crude oil. Elsewhere, threats of a strike by oil workers in Nigeria, followed by increasing violence near oil facilities, have also reduced supplies, although this is a more recent development.

Prices of crude oil have dropped since March 17, but remain volatile. Rising Venezuelan production, the end of the winter demand season, and promises by the Organization of Petroleum Exporting Countries (OPEC) to sustain oil production sufficient to meet any shortfalls may dampen future price increases.

Assuming quick resolution of the Iraq conflict and a return to normal production levels by Venezuela, crude oil prices are likely to decline. Some industry analysts anticipate world oil prices may return to $20 to 28 per barrel in the near future.

Unusually Cold Winter – Impact on Heating Oil Markets of the Northeast

The unexpectedly cold winter in the Eastern United States and accompanying high natural gas prices caused unusually high demand for heating oil in 2003. This high demand caused heating oil prices to rise by over 50% on the East Coast relative to 2002 prices. Since refiners have some flexibility in adjusting the proportions of the various petroleum products that come out of a barrel of crude oil, high heating oil prices cause other petroleum fuel prices to rise, albeit to a lesser extent. Exacerbating these price increases were the historically low levels to which domestic inventories of oil and petroleum products had fallen[13].

[13] See “Inventories” on page V-1

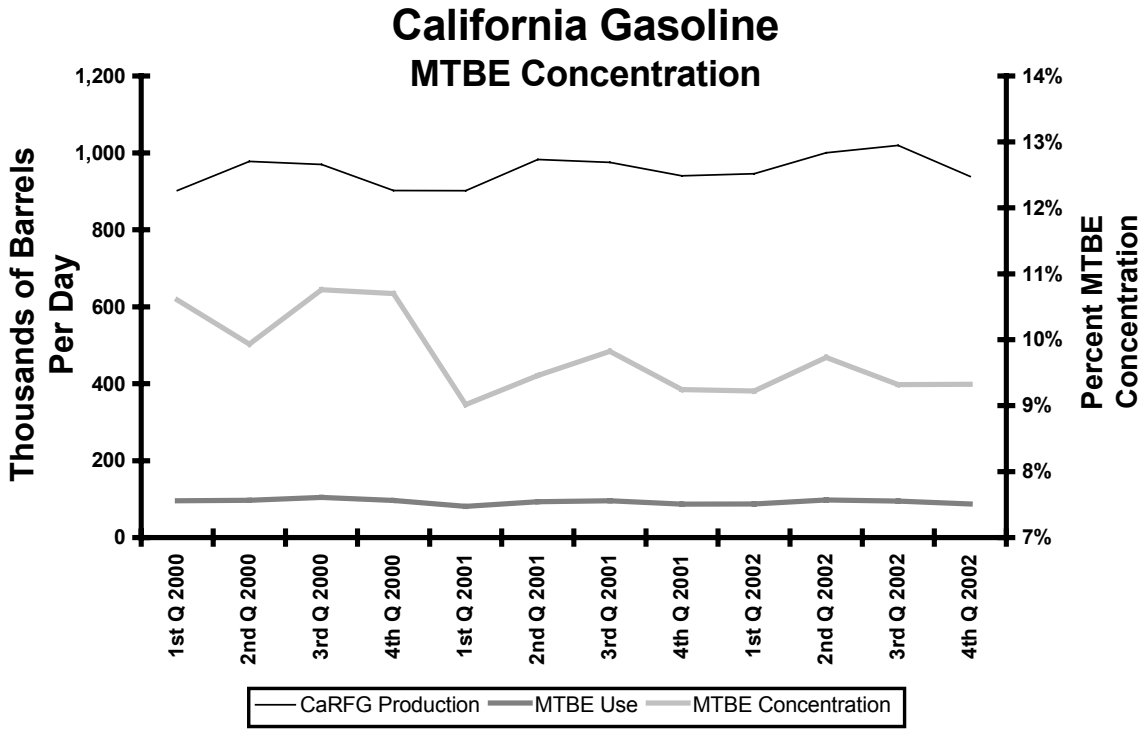
III. Phaseout of Methyl Tertiary Butyl Ether (MTBE) and Transition to Summer Gasoline in California

MTBE Phaseout

MTBE is a type of gasoline blending component that is classified as an oxygenate because it contains oxygen. MTBE has been used since the 1970s as an octane replacement for lead in gasoline. Beginning in the winter of 1992-1993, MTBE was used in gasoline to help reduce emissions of carbon monoxide (CO). Oxygenates were later mandated for use in all federal reformulated gasoline (RFG) regions of the United States to help reduce air pollution. Nearly 80 percent of California's gasoline is sold in areas of the state that are designated Federal RFG regions.

The ARB adopted reformulated gasoline regulations specific to the state that allows refiners to produce complying gasoline with or without the use of oxygenates. Federal RFG regulations however, require a minimum amount of oxygen in the gasoline regardless of California law (referred to as the Federal Minimum Oxygen Requirement). This means that over 80 percent of the gasoline must contain some type of oxygenate, primarily MTBE or ethanol. The total use of MTBE during 2002 amounted to over 1.4 billion gallons (see Figure 8) at an average concentration of 9.3 percent in all gasoline, while ethanol use was estimated to be 100 million gallons.

Figure 7



Beginning in 1995, MTBE was detected in a number of water wells near Santa Monica. Concerns were raised as to the potential impact on California's water resources if MTBE use was continued. Based on these and other concerns, Governor Davis issued an executive order eliminating the use of MTBE from California's gasoline by December 31, 2002.

In 1999, the Energy Commission estimated that refinery production costs would increase 3 to 6 cents per gallon as a result of the MTBE phaseout. At the lower end of the estimate, average production costs were calculated to increase by 3.4 cents[14] per gallon if a waiver from the federal minimum oxygen requirement were granted, and refiners were permitted to use ethanol on a discretionary, rather than mandatory basis. At the same time, average production costs were expected to increase by 6.4 cents[15] per gallon if a waiver from the federal minimum oxygen requirement were denied (which occurred on June 12, 2001)

[14] MathPro refinery modeling output table Exhibit 6, Case 2a, December 1999.
[15] MathPro refinery modeling output table Exhibit 6, Case 2e, December 1999.

and refiners were required to use ethanol on a mandated, rather than a discretionary basis. Since the waiver was denied, the average estimated gasoline production cost increase is about 6.4 cents per gallon, which is 3.0 cents per gallon more because the waiver was not granted to California. Most of the increase is due to the requirement for greater quantities of more expensive gasoline imports.

During the first few months of 2002, concerns were raised that the removal of MTBE might be difficult and could lead to temporary gasoline supply problems since some of the modifications to refineries, pipelines, and terminals were behind schedule. In addition, other concerns included the adequacy of ethanol supplies from mid-west states and the ability to transport these supplies routinely to California. Based on these concerns, and adequacy of gasoline supplies for California consumers, Governor Davis extended the MTBE phaseout date to December 31, 2003. This extension also provided additional time for refiners and terminal operators who were taking longer than anticipated to complete modifications to their facilities.

Most refiners in California are either already using ethanol or will be using ethanol ahead of the Governor's deadline. The resulting transition, which began in January 2003, is progressing without any major problems. The rest of the refiners will discontinue their use of MTBE later this year. Table 1 lists California's refiners and their status regarding the early MTBE phaseout. Approximately 60 to 70 percent of California's gasoline is already blended with ethanol. Earlier concerns about the adequacy of ethanol supplies have since diminished as the ethanol production industry has added significant capacity to meet California's annual demand of 565 to 660 million gallons of ethanol. Since the price of ethanol to refiners is currently at modest levels relative to gasoline, the recent increase in California's gasoline prices can not be attributable to availability or cost of ethanol.

Ethanol Prices

Industry sources indicate that 80 to 90 percent of the ethanol used in California today is delivered under contracts that were negotiated in early-to- mid 2002. These contracts were negotiated when the market price for ethanol was low relative to current prices. The Midwest posted "terminal price" of ethanol, an indicator of the contract price trends, shows ethanol below $1.00 per gallon in the period of April through June 2002. While the Energy Commission staff did not examine any of these contracts, industry contacts indicated that about half the contracts were fixed price agreements, which were indexed to either the spot pipeline price of California reformulated gasoline for ethanol blending (CARBOB) or federal reformulated gasoline prices posted on the New York Mercantile Exchange (NYMEX).

The negotiated fixed price contracts were in the range of $1.12 to 1.20 per gallon. When taking the gasoline blender's tax credit of 52 cents per gallon into account, the net cost of ethanol to the refiner (or blender) of California reformulated gasoline is 60 to 68 cents per gallon. Therefore, the estimated cost of ethanol for refiners is significantly below the average wholesale price of gasoline during the first quarter of 2003.

While the details are confidential just as with fixed price contracts, the NYMEX deals involved a premium of 40 cents per gallon and CARBOB contracts had a premium of about 30 cents per gallon. When taking the gasoline blender's tax credit of 52 cents per gallon into account, the net cost of ethanol to the refiner (or blender) using these types of contracts will almost always yield an ethanol cost less than the price of wholesale gasoline.

Since both types of contracts have already yielded ethanol prices lower than gasoline, ethanol costs were not likely a contributing factor to the recent increases of California's gasoline prices.

Table 1
Status of California Refinery MTBE Phaseout

Northern California Refiners	**Location**	**Notes**
ChevronTexaco	Richmond	Phaseout later this year
ConocoPhillips	Rodeo	Have been using ethanol for more than one year
Kern Oil	Bakersfield	Blending ethanol
Shell	Bakersfield	Blending ethanol
Shell	Martinez	Blending ethanol
Tesoro	Concord (Avon)	Using limited quantity of ethanol, complete phaseout later this year
Valero	Benicia	Phaseout later this year
Southern California Refiners		
BP	Carson	Blending ethanol
ChevronTexaco	El Segundo	Blending ethanol
ConocoPhillips	Wilmington	Have been using ethanol for more than one year
ExxonMobil	Torrance	Blending ethanol
Shell	Wilmington	Blending ethanol
Valero	Wilmington	Using limited quantity of ethanol, complete phaseout later this year

MTBE Phaseout and Reduced Gasoline Production

When refiners discontinue the use of MTBE and switch to ethanol, the volume of reformulated gasoline production is impacted. This occurs for two reasons: first, because MTBE is used at a concentration of 11 percent by volume, while ethanol is currently being used at a concentration of 6 percent by volume; second, when refiners begin to produce summer grade gasoline, additional blending components must be removed before ethanol can be mixed with the gasoline. This ensures that the final blend complies with distillation temperature, volatility limits and other California reformulated gasoline specifications. This means another 5 percent of gasoline production capability is reduced. Without refiners taking other actions, California's total gasoline production capability could be reduced by nearly 10 percent.

Some refiners responded by making modifications to their refineries to slightly increase production of blending components from their alkylation units, while others increased imports of blending components, and another refiner converted some conventional gasoline to reformulated gasoline for use in California. Coupled with the fact that some refiners decided to adhere to the new phaseout date, the total decrease of gasoline production capability is now estimated to be in the range of 1 to 2 percent or 10 to 20 thousand barrels per day. Since this impact on production did not occur until the transition to summer gasoline was initiated on March 9 in Northern California and March 11 in Southern California, the decline had little impact on the price increase.

Transition to Summer Gasoline

Gasoline specifications in California, along with some other areas of the United States, become tighter during the ozone season (which includes the summer months) to improve the emission performance of automobiles. In California and Federal RFG areas in the rest of the U.S., gasoline volatility (referred to as Reid vapor pressure or Rvp) limits are set to a maximum of 7 to 7.2 pounds per square inch. To ensure that storage tanks and retail service stations are complying with the lower limits by the time of the ozone season, the production of the low volatility gasoline usually begins prior to early spring in Southern California and spring in Northern California. This longer lead-time allows the remaining residual quantities of winter gasoline throughout the distribution infrastructure to be flushed out prior to the beginning of the ozone season.

The ARB recognized the increased difficulty of blending with ethanol and adjusted the deadline for complying with the transition to low volatility gasoline by an additional month. This temporary flexibility (also in place for next year) permitted refiners to continue producing winter gasoline for several more weeks than previously scheduled. This change in the transition schedule was beneficial to California and probably prevented gasoline prices from going higher than they may otherwise have.

The greater difficulty of consistently producing complying gasoline combined with the lack of experience blending the new type of gasoline with ethanol could lead to production difficulties for refiners. In turn, refiners could have difficulties meeting their scheduled pipeline shipments. However, two weeks into the summer gasoline season, California has experienced only one instance of a refiner having problems producing gasoline for ethanol blending that resulted in a shipping delay of three days. This incident occurred in Northern California during the middle of March and was not a factor in the price divergence as the gasoline was eventually delivered. When a scheduled delivery of gasoline into the pipeline is delayed, an inconvenience to other schedules and temporary borrowing of supplies from other companies usually ensues. If a refiner is unable to deliver gasoline for more than a couple of days, however, temporary shortages at terminals and production slowdowns at the refinery can result. Both of these developments can adversely impact gasoline supplies and place upward pressure on prices.

The early, voluntary phaseout of MTBE by most of California's petroleum industry and the transition to low volatility gasoline do not appear to have been primary causes of the recent high gasoline price divergence in California, with the exception of the logistical issues for unbranded marketers described below.

Logistical Issues

Logistical factors include two issues that may have contributed to high gasoline prices. One of the issues involves the voluntary transition away from MTBE and the resulting shift in new supply relationships. The other issue involves potential supply problems that may have resulted from ethanol distribution challenges.

The voluntary shift away from MTBE by most of California's refiners has resulted in new supply and logistics arrangements, which contributed to supply problems for independent gasoline marketers. These new supply arrangements are different for Northern and Southern California.

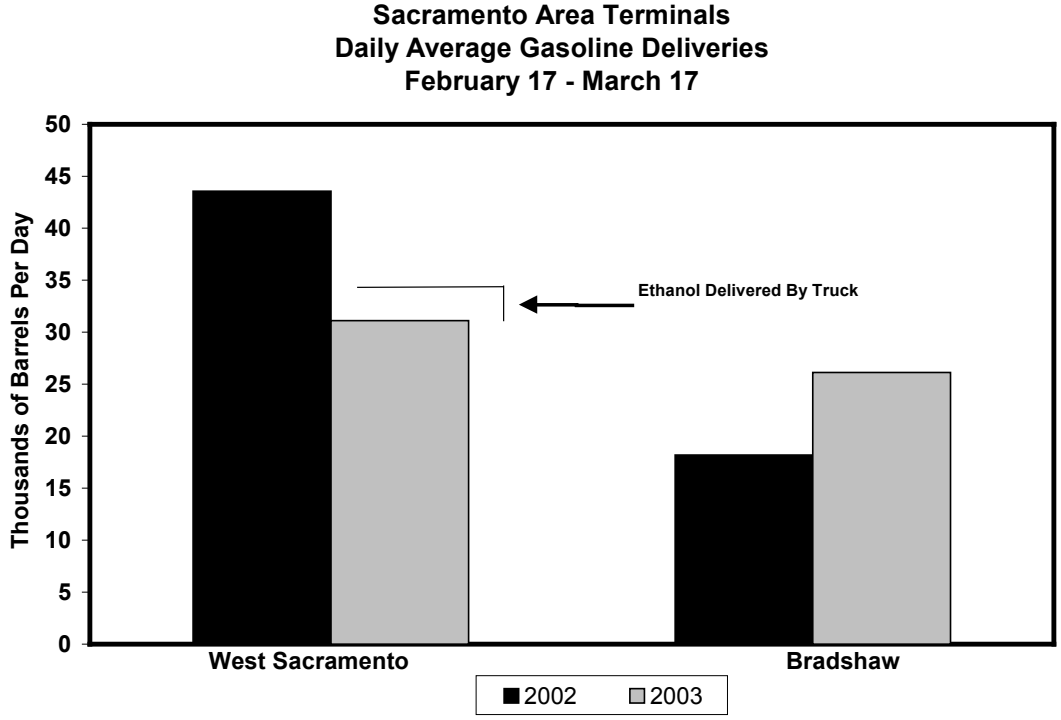
Northern California Logistics Difficulties

The transition away from MTBE changed terminal operations. One of these changes is that ethanol is blended at terminals, rather than at refineries. Terminals now must make arrangements to store ethanol separately in segregated storage tanks. In addition, some proprietary terminals in West Sacramento were allowing some independent marketers to share space in their storage tanks. When the transition away from MTBE occurred, some of these customers were unable to switch to ethanol because the refiners providing gasoline to these marketers continued production of gasoline containing MTBE. Since the two different types of gasolines must remain segregated, these marketers were forced to relocate to other Sacramento area terminals that had sufficient spare storage capacity for independent marketers distributing gasoline-

containing MTBE. Approximately 75 percent of this gasoline business was relocated to the Bradshaw terminal and the remaining portion to other Sacramento area locations.

The switch to a new terminal would normally not create a problem if the two terminals were located along the same pipeline. But in this instance, the West Sacramento terminal and Bradshaw terminal are located on separate pipelines with different capacity limitations. The pipeline that serves the Bradshaw terminal originates in Concord, extends to Stockton, with links to Fresno. Spare capacity in this line is limited. The shift of independent marketers from West Sacramento to Bradshaw has resulted in an estimated shift in gasoline shipments of approximately 8 thousand barrels per day (see Figure 9).

Figure 8



Increased gasoline deliveries and higher volumes of diesel and jet fuel have constrained capacity in this pipeline segment. When distribution demand at a terminal exceeds inventory, temporary supply problems can occur. This has been the case with supplies of unbranded[16] gasoline at the Bradshaw terminal. As a direct result, some gasoline marketers had to obtain alternative supplies from other terminals to maintain deliveries to their customers. Unexpected

[16] "Unbranded" gasoline refers to wholesale gasoline that is normally sold to independent marketers who do not have a contractual obligation to consistently purchase fuel from a specific suppliers.

demand at other terminals placed upward pressure on prices at these locations too, along with the Sacramento region. Consequently, unbranded prices throughout Northern California were adversely impacted during early 2003. Difficulties with the Bradshaw terminal could become a bit worse as seasonal demand for both gasoline and diesel fuel increase and if requests for shipments to the terminal exceed the pipeline's capacity. Kinder Morgan, the owner of California's largest common-carrier petroleum product pipeline system, has already made modifications to this pipeline system to improve capacity. Further modifications will entail construction projects that could take two years to complete. Once the rest of the refiners have completed their transition away from MTBE later this year, independent marketers should have an opportunity to obtain permission from owners of proprietary terminal tanks in West Sacramento to lease back some of the storage space that was temporarily lost at the outset of 2003.

Southern California Logistics Difficulties

The circumstances in Southern California were different than in Northern California and created a different set of issues that led to temporary supply problems primarily for independent marketers. All of the refiners in Southern California, except for Valero, eliminated the use of MTBE beginning in January of 2003. Previously, supplies of gasoline to various types of marketers were provided by a number of companies either through direct supply or exchange agreements. After the transition away from MTBE, companies were forced to shift additional gasoline supplies from Northern to Southern California to maintain adequate volumes of gasoline for their contracted customers who were formerly supplied by some of the refineries in Southern California.

Typically marine barges facilitate the movement of gasoline from Northern to Southern California. An adequate number of barges and sufficient throughput capacity at the wharf in Southern California are necessary to accommodate the movement of supply without disruption. During February, supplies of unbranded gasoline were intermittently inadequate to meet demand, which resulted in a rapid increase in unbranded prices. This problem was exacerbated by an unanticipated increase in independent marketer demand. Some of this demand was probably a result of the inability of some independent marketers to obtain gasoline from major refiners since most of the major refiners had switched to ethanol. During the ozone season when the volatility of gasoline is controlled, gasoline containing ethanol cannot be mixed with any other type of gasoline (to avoid a violation of the volatility standard). As a result, the independent marketers that were using gasoline containing MTBE were no longer able to obtain fuel from major refiners who had made the conversion to ethanol. However, during the winter months (January through mid-March) this was not a limitation. This could have shifted additional demand to unbranded suppliers of gasoline containing MTBE. Thus, the initial demand forecasts by companies

shifting gasoline supplies to Southern California was less than historical demand levels for this time of year.

Refiners have made changes to their distribution logistics and added additional marine barges to accommodate the higher demand levels. Over the next several months, the transportation and distribution facilities associated with this shift of gasoline from Northern to Southern California should improve and reduce the number of instances that independent marketers of gasoline with MTBE experience temporary outages. Upward pressure on gasoline prices should be eased.

Ethanol Logistics

Prior to January 2003, refiners blended MTBE with gasoline at the refinery before shipping to terminals located throughout the state. Following the phaseout of MTBE, however, refiners will be blending ethanol into gasoline at the terminals as tanker trucks are loaded with gasoline. The reason for this change in procedure is to avoid potential contamination of the ethanol with water in the pipeline system and to reduce the possibility of pipeline corrosion. Ethanol has an affinity for water, which is usually present in small quantities throughout the pipeline system. Water usually gets into the system as part of the diesel fuel shipments. Diesel fuel is transported through the same pipeline as the gasoline and water will tend to collect in low points along the pipeline route. Ethanol shipped through the pipeline would have a tendency to absorb the water and any associated impurities. Kinder Morgan and other petroleum product pipeline operators are also reluctant to ship ethanol through their systems because of corrosion concerns. Ethanol has a tendency to clean the interior walls of pipes, removing the scale that serves as a protective coating. This process can lead to increased corrosion and heightened risk of a pipeline leak. For these reasons, ethanol is typically delivered to terminals by tanker truck or rail car, rather than by pipeline.

The majority of ethanol used in California originates from production facilities located in the Midwest. Ethanol is shipped by both rail car and marine vessel to main distribution terminals. Trucks are then used to disperse the ethanol to the various gasoline terminals located throughout the state. Modifications have been completed at most of the terminals to allow for the receipt of ethanol at the main distribution and outlying terminals. In some cases, additional ethanol storage tanks were constructed. In other cases, additional rail spurs were completed to allow for receipt of ethanol by rail car. Most of the terminals in the Kinder Morgan system already have the capability to receive and blend ethanol. A couple of their terminals will require more extensive modifications (Bradshaw terminal in Sacramento, Colton, and Imperial terminals in Southern California) and take longer to complete. Kinder Morgan is expected to complete this work later this year. To date, there have been no reports of problems with ethanol supplies or ethanol deliveries to California and outlying terminals.

Ethanol supplies and distribution to terminals have been sufficient to meet the needs of the transition away from MTBE during the first three months of 2003. These factors in the supply of gasoline do not appear to be responsible for the recent gasoline price increases. However, the MTBE phaseout has resulted in a shift of independent marketer demand so that primary suppliers to these marketers struggled to maintain adequate supplies of gasoline consistently to these customers. This is a contributing factor to a rapid price increase for unbranded gasoline in both Northern and Southern California. The recent changes by refiners to accommodate this shift in customer base will probably improve the timely availability of supplies of unbranded gasoline throughout the remainder of this summer. But the terminal capacity problems in Northern California could become a bit worse throughout the summer as demand increases and pipeline deliveries are constrained due to capacity limitations. The Energy Commission will continue to monitor this issue closely.

IV. Refinery Operations

Episodes of rapid price increases for gasoline over the past several years have often been attributable, in part, to refinery difficulties. Unplanned refinery problems and planned maintenance that extends beyond the anticipated turnaround schedule for maintenance and repairs are two areas of investigation. These types of events cause refiners to obtain additional supplies quickly to meet commitments. To accomplish this goal, refiners employ a number of strategies.

One strategy is to draw supply from inventories. Another is to purchase gasoline or diesel from another refiner or importer who has excess supplies on hand. During the winter months, California refiners can produce a bit more gasoline than the market demands as long as their facility is not undergoing any significant maintenance. Lastly, refiners can choose to import gasoline or blending components from outside of California. Importing is usually the least preferred option except for refiners with refineries in the Pacific Northwest, because California is geographically isolated from alternative supply locations. In other words, it takes a minimum of 3 to 6 weeks to locate a source, obtain adequate shipping and deliver cargoes to California. This precludes imports as an immediate source of additional supplies. Imports, however, can play a vital role in replenishing inventories and supplying fuel to contracted customers.

Planned Refinery Maintenance and Projects

A typical maintenance program, or “turnaround” as it is termed within the petroleum industry, includes the shutdown of one or more processing units within the facility that reduces production. This is done for a number of reasons including catalyst regeneration, cleaning of vessels, conducting inspections, and for technological upgrades.

Planned refinery maintenance and project work typically requires refiners to build inventories of finished gasoline and diesel for later withdrawal when the anticipated decrease in refinery production occurs. Another strategy that refiners employ is to build up inventories of feedstocks so other process units can continue to operate. A final strategy is to purchase additional blending components in advance.

Some of the work was with scheduled maintenance projects, while other work was for the transition away from MTBE. Since all of this work was “planned,” inventories of blending components and finished products were increased in advance to minimize impacts on supply. Much of this work was normal and occurs annually, while some of the work involved more extensive planned maintenance that only occurs every several years. Supply is not usually affected by these activities unless the work extends beyond the expected return to service date. This unforeseen development occurred during the latter portion of this

year's price increase, and contributed to the gap in prices between California and the rest of the United States.

During the first three months of 2003, seven California refineries conducted work that required the closure of one or more process units. The cumulative impact on gasoline output was approximately 8.5 million barrels, with a peak reduction of reformulated gasoline production of 250,000 barrels per day for the week ending February 21. (Last year during scheduled turnaround season, the lowest point of reformulated gasoline production occurred during the second week of January.) Refiners compensated for this decline in production by drawing down inventories of gasoline and blending components that had been stockpiled in advance of the work and by importing some additional gasoline from outside the state. The majority of the planned maintenance work was completed before the end of February and stockpiled inventories were primarily used to replace the lost gasoline production. Therefore, the continued retail price divergence during the first three weeks of March was likely not the result of this planned maintenance work.

Delays Impacting Maintenance Schedules and Production

Any delay to resuming normal production levels can impact supply and the price of finished petroleum products. The greater the need for replacement volume and the longer the duration of the extended work the bigger the impact on wholesale and retail prices. Of the seven refineries that were conducting maintenance during early 2003, three of the facilities experienced difficulties completing their planned work in the anticipated time allotted. As a direct consequence, these refiners had to seek alternative supplies of petroleum products to replace the quantity of gasoline and diesel fuel that would have been provided by increased production following completion of the work. The total quantity of gasoline purchased or withdrawn from inventories amounted to nearly 2.0 million barrels over a period of three weeks, roughly 100 thousand barrels per day. This quantity is equivalent to 10 percent of the state's gasoline demand. The extended work and lower production appears to have been a significant contributing factor to California's recent price divergence from average U.S. prices. Although it is not uncommon for some of the planned maintenance work to encounter slight delays beyond the original schedule, the combined duration of extended time and magnitude of the impact on gasoline supplies at the end of this year's turnaround activity was unusually severe.

California Refinery Problems

Another area of investigation involved a review of any operational problems that may have resulted in periods of diminished gasoline production, apart from the reduced production resulting from the planned or extended refinery maintenance.

Unplanned Outages and Impacts on Supply

On occasion, refiners experience the temporary loss of various process units that interrupt operations to the extent that gasoline and diesel fuel production output is reduced. When these types of unanticipated events take place, refiners seek alternative sources of replacement supplies to maintain contractual obligations. These additional supplies are normally obtained from other refiners and marketers who are willing to reduce their own inventories in exchange for higher prices. The depletion of inventory carries a certain level of risk because an unplanned outage by another refinery that has reduced inventories to lower-than-normal levels could experience increased difficulty obtaining alternative supplies themselves. If the equipment problem is significant, the reduction in output and subsequent impact on wholesale prices can be swift. Several refinery problems over the last seven years resulted in price spikes that exceeded 25 cents per gallon and lasted several weeks.

During the last week of February through the first week of March 2003, four different unplanned refinery problems resulted in a cumulative loss of about 500,000 barrels of gasoline production. This temporary reduction of gasoline output amounted to an average loss of nearly 36 thousand barrels per day over this two-week period, or roughly 4 percent of daily supply. Although the average reduction in gasoline output has been greater due to the refinery maintenance projects, these temporary losses of supply are anticipated far in advance. Refiners typically import additional supplies from outside the state that can then be used to make up for the reduced production. Unanticipated refinery problems, however, may have a greater impact on gasoline prices since there is no lead-time to build inventories. The magnitude of the price impact could be significantly greater if inventories are already low when the unanticipated outage occurs.

The refinery problems experienced at some California facilities have since been corrected, allowing the resumption of more normal gasoline production levels. Although these unanticipated outages were temporary in nature, the decreased gasoline production was one factor responsible for the price divergence during the latter days of February and through the first week of March. Any future production problems affecting gasoline output, unrelated to the extended turnarounds, would decrease supplies and likely put upward pressure on wholesale prices.

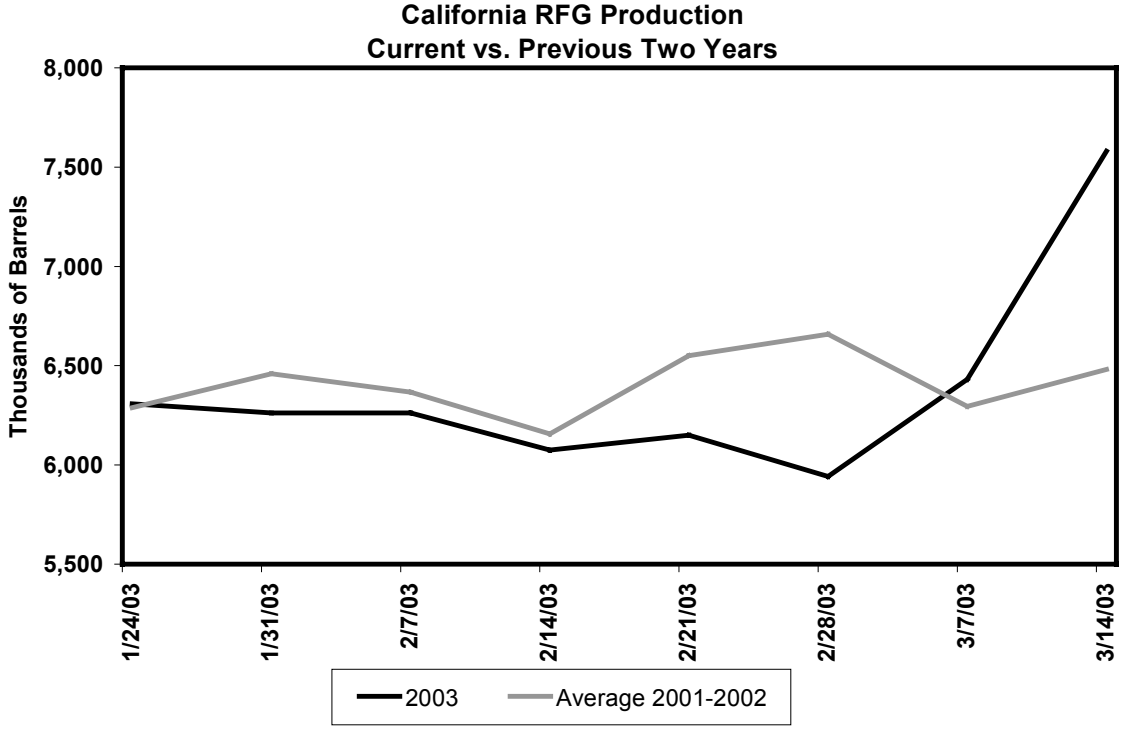
Impact on Gasoline Production

Figure 9 illustrates the lower production level for gasoline during the time that California's retail prices increased at a greater rate than the rest of the United States. Note that production during this time is lower than the average for the previous two years. The low production level occurring later in the turnaround season is a reflection of the problems that extended the maintenance period for three of the refiners. Only recently has total production begun to increase, with completion of planned maintenance projects, correction of temporary refinery

production problems, and a resumption of normal output for most refineries. Additional production increases should occur as the last of the extended maintenance work is completed in late March, increasing supplies and easing upward price pressure.

Although total production of gasoline during the period of maintenance and refinery problems was lower than during the previous two years, gasoline output by some of the refiners equaled or exceeded record production levels. This indicates that refiners, who were not experiencing operational problems and not performing a turnaround, were motivated by high prices to maximize production and supply as much gasoline into the market as possible.

Figure 9



The unanticipated refinery problems and extended duration of some maintenance resulted in over 3 million barrels of gasoline production being lost and having to be replaced by depleting inventories and increased purchases from other refiners. Despite record production from a couple of refiners who were not involved in maintenance work, total gasoline production from California refiners was lower than the previous two-year average between late January and early March. As a result, California's gasoline market became tight and contributed to the increased divergence in California and United States prices.

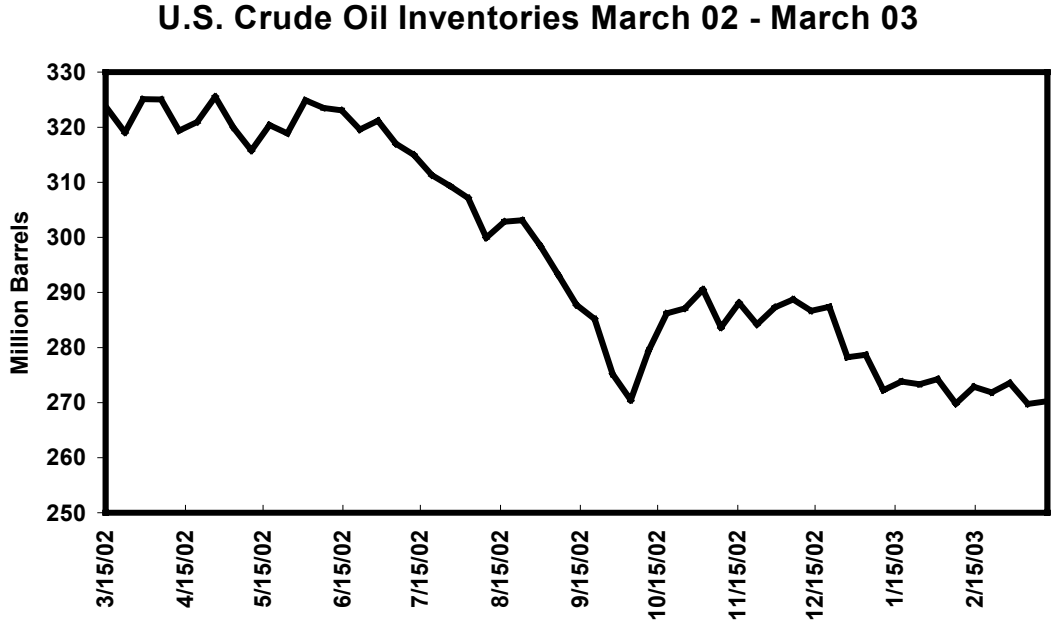
V. Inventories

In any commodity market, the total amount of inventories plays a large role in determining the price of a commodity. When inventories are low, the commodity is perceived to be scarce and both sellers and buyers will bid up the price accordingly. This will be true irrespective of the costs of production.[17]

Crude Oil Inventories

The Energy Information Agency reported in February 2003 that crude oil inventories in the U.S. were at a 25-year low (see Figure 10). Crude oil inventories were also low worldwide. These low inventories have caused oil prices to rise dramatically in the U.S. and throughout the world as well.

Figure 10



Additional pressure was put on crude oil inventories (and in turn, on crude oil prices) prior to the recent start of the war in Iraq. Many believe that crude oil prices could drop dramatically once U.S. forces secure Iraqi oil fields. No one wanted to store oil at $37 per barrel that would then have to be sold at a significant big loss in the following month. This created an incentive to hold even lower inventories in the face of the near-term threat of war in Iraq. Market

[17] The opposite can also occur. Because overproduction or oversupply, it is possible for prices to be bid so low that suppliers are forced to sell their product for below cost. This can and has happened in California gasoline markets, most notably in 1998 and 2002.

analysts refer to this phenomenon as a "war premium" and believe it may have added $5 to $8 to the cost of a barrel of crude oil this winter.

Gasoline Inventories

The relationship between inventories and prices in gasoline markets is exactly the same as described above for crude oil markets. To the extent that gasoline suppliers expect prices will be lower in the future, the incentive to hold inventories is reduced. As a result, prices can rise significantly above the cost of production.

Speculation also contributes to gasoline price volatility. Just as the anticipation of supply interruptions in the Middle East caused crude oil prices to escalate worldwide, fear of possible blending problems with California's new summer gasoline caused additional speculation in an already volatile gasoline market.

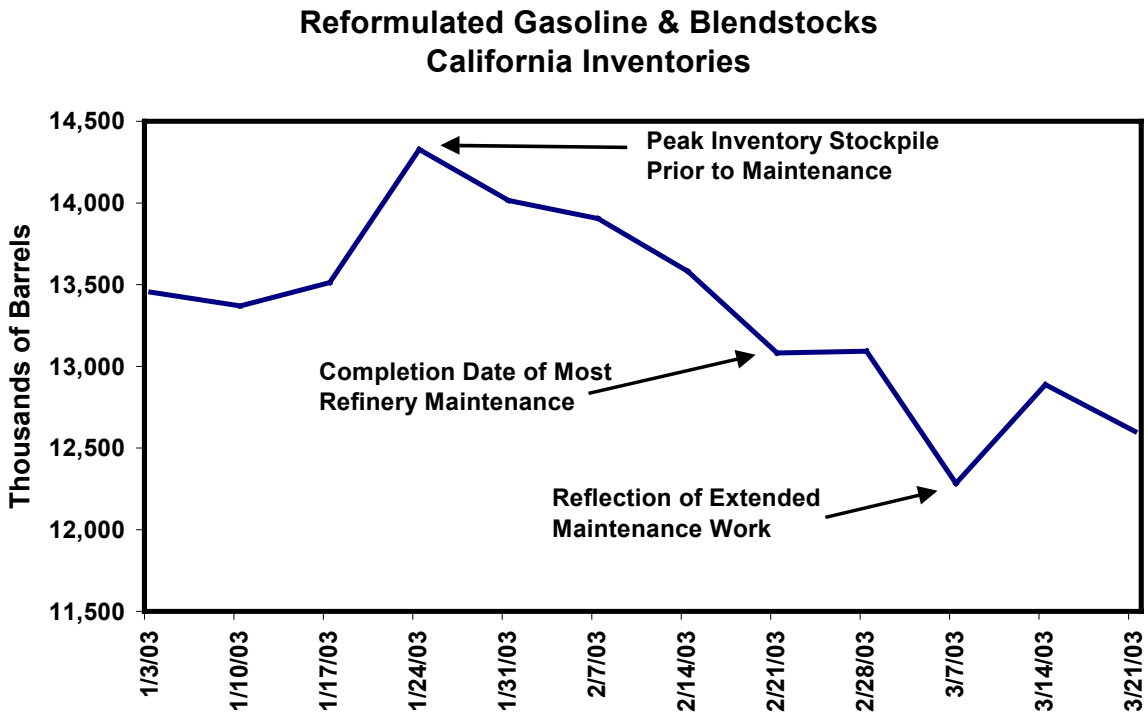
When gasoline supplies are tight, even a rumor of refinery problems can have major consequences in the fuels market. A mistaken report of a refinery outage in 1999, for example, caused the spot price to jump 13 cents in one afternoon. Most recently in late February and early March of 2003, word spread throughout the industry that California refiners were having difficulty making CARBOB gasoline that could meet the new summer specifications. The trade press later reported that Shell had made a test batch of CARBOB in February that did not quite meet summer specifications, but it was still usable as winter fuel. Despite this clarification, the rumor raised industry concerns.

In another case, ethanol-blending equipment malfunctioned at a San Diego fuel terminal. As a result, British Petroleum had to pump non-compliant regular gasoline out of underground tanks at 59 of its local ARCO retail outlets. This error was complicated by an isolated incident of a lone disgruntled Texaco service station owner posting gasoline prices as high as $4.29 a gallon for premium. The combination of these events led to rumors reported by the national press that stations in San Diego had inadequate supplies of gasoline and that stations were closing. It is not clear, however, these events contributed to the price increases.

Refiners and other marketers store petroleum products at 13 refineries and over 60 terminals located throughout the state. During periods of refinery turnarounds and unplanned outages, these inventories can be an important source of additional supplies to offset declines in production. Traditionally, inventories of gasoline and blending components are stockpiled in advance of planned maintenance and other projects at refineries. This type of activity occurs in the winter months when gasoline demand is lower, production capability is higher, and sources of outside supply are more plentiful. The year 2003 was no exception. Figure 11 shows that California inventory levels for reformulated

gasoline and blending components increased to a peak of nearly 14.5 million barrels on January 24, 2003. Although one of the planned turnarounds commenced the previous week, most of the other planned maintenance commenced shortly after the peak. This figure also illustrates the decline of inventory levels as refiners' reformulated gasoline production steadily declined through the end of February (see Figure 9). In addition, the continued decline of inventory levels occurred because of extended maintenance work.

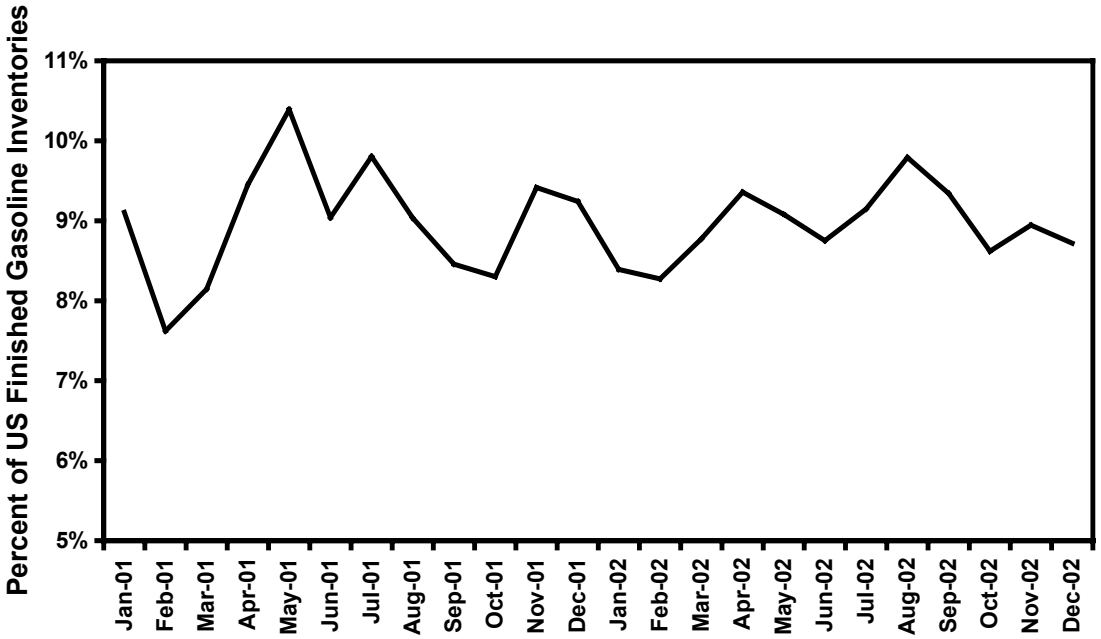
Figure 11



Over the last couple of years, California finished gasoline inventory levels tend to be below U.S. averages.[18] Between January 2001 and December 2002, California consumed 11.5 percent of all gasoline consumed nationwide, but only accounted for 9 percent of total U.S. finished gasoline inventories over the same timeframe (see Figure 12). The implication of these lower inventory levels, relative to the U.S., is that extended maintenance and unplanned refinery outages can have a greater impact on prices because the industry has less inventory available to augment supply. This problem is compounded by the fact that California is a more geographically isolated market, compared to other regions in the U.S., that requires more time to resupply by marine vessel from locations outside the State. These lower inventory levels were probably a contributing factor to the recent price increase.

Figure 12

Finished Gasoline Inventories
California Compared to United States
2001 - 2002



[18] Consumption data are average annual data, 2001 through 2002 from the U.S. Energy Information Administration (EIA) and the California Board of Equalization (BOE). Monthly gasoline inventories for US include all RFG, finished and other gasoline. California data include RFG. U.S. data provided by EIA and California data provided by the Energy Commission.

VI. Other Supply and Price Issues

Other events and changes that occurred during the period of rapid price increases were examined to determine what impacts, if any, these issues may have had on supply and price of gasoline for California. Specifically, gasoline supply problems that occurred in the Phoenix market, a supply of non-complying gasoline to several service stations in San Diego County, and the report of a service station in El Cajon (near San Diego) that was charging an exorbitant price for gasoline.

Arizona Gasoline Supply Problems – Impact on California

While California's gasoline prices were rising to unprecedented levels in late February and early March, supply problems in Phoenix caused gasoline prices in Arizona to rise even higher than prices in California. Arizona's supply problems increased demand for gasoline exports from Southern California and likely contributed to the severity of the rise in California gasoline prices.

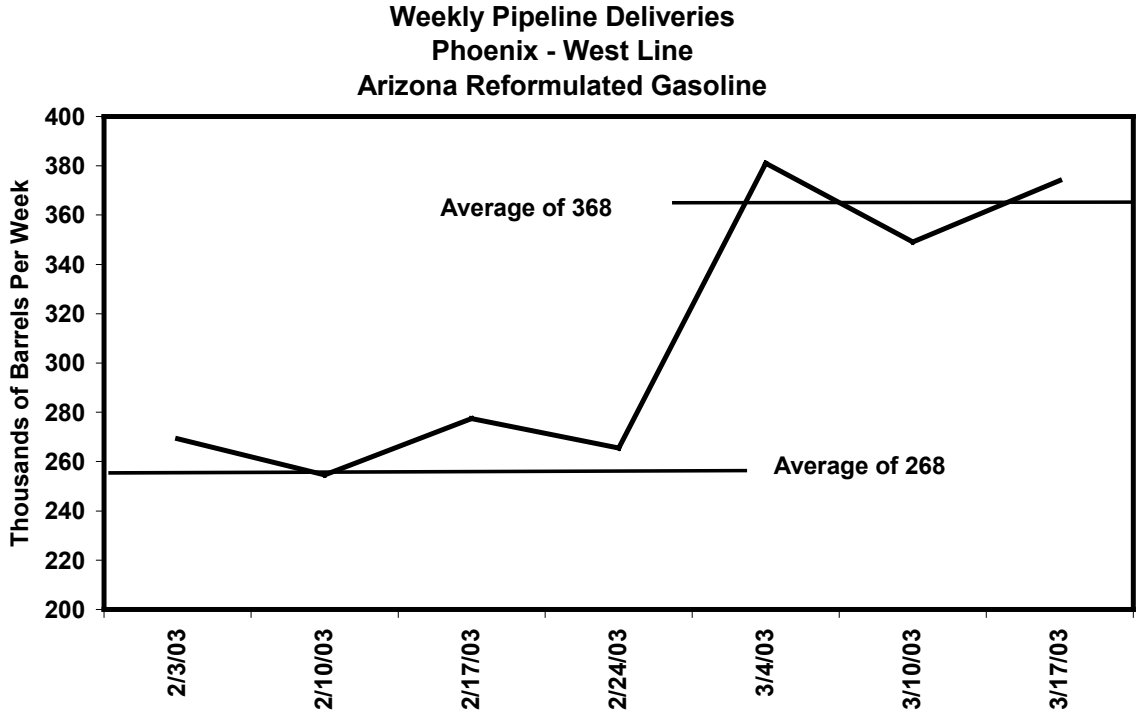
There are no refineries in Arizona to provide this state with a source of petroleum products. Instead, residents depend on gasoline that is primarily shipped through two pipelines that originate in Eastern Texas and Southern California. Refineries in both regions provide almost all of the gasoline, diesel and jet fuel supplies necessary to meet Arizona demand. Some smaller volumes of petroleum products are also trucked from refineries in New Mexico and a terminal in Las Vegas. Some of the Southern California refineries produce gasoline that meets the specifications for Phoenix and surrounding areas, besides the reformulated gasoline provided for the Southern California market.

Arizona reformulated gasoline (Arizona RFG) regulations allow shippers from the east and west to supply the Phoenix market with gasoline that is similar to Federal Phase II RFG (referred to as Type 1 gasoline) or California Phase 2 RFG (referred to as Type 2 gasoline) specifications. The only stipulation is that Type 2 gasoline must be used during the winter months (November 1 through March 31) and contain ethanol at a concentration of 10 percent by volume. The gasoline shipped to Phoenix during the summer months meets the less stringent Type 1 standards. When refiners in Southern California produce gasoline for export to Phoenix, many of the blending components are the same as those needed to produce California reformulated gasoline. Therefore, any increased shipments of Arizona reformulated gasoline to Phoenix from California refiners can tighten gasoline supplies in Southern California, placing additional upward pressure on prices.

During late February/early March 2003, supplies of Arizona reformulated gasoline were constrained to the point that several suppliers of unbranded

gasoline experienced temporary shortages. Prices in the Phoenix market increased as marketers attempted to secure additional supplies. Total gasoline deliveries to the Phoenix market were slightly lower than over the same time frame last year, but the reason for this was unclear. Refinery problems and extended turnarounds at facilities supplying gasoline from the east could be responsible for the lower levels of deliveries to the Phoenix market. Whatever the cause, the impact on California was clear. Figure 13 depicts deliveries of Arizona reformulated gasoline to the Phoenix market that originated from Southern California.

Figure 13



The figure above shows that deliveries on the West Line[19] increased by an average of 100,000 barrels per week or approximately 14 thousand barrels per day as various marketers scrambled to maintain adequate supplies to meet their contractual obligations. Since many of the components used to make this Arizona gasoline are the same as those used to produce California reformulated gasoline, the additional shift in shipments to Phoenix did contribute to continued tight gasoline supplies in Southern California. At this time, supplies of gasoline in the Phoenix market appear to be adequate, and prices at that location continue to drop back down to more normal levels.

[19] The West Line refers to a portion of the Kinder Morgan common carrier petroleum pipeline infrastructure network that stretches from the Los Angeles Basin to Phoenix and Tucson in Arizona.

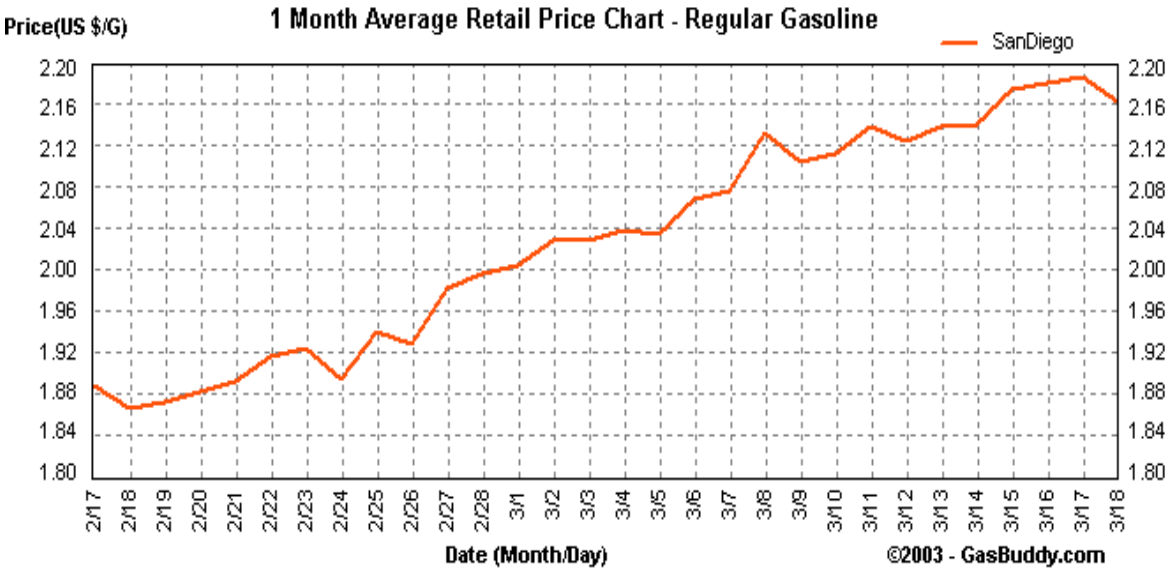
San Diego Retail Gasoline Issue

On March 12, 2003, approximately half of the ARCO retail gasoline stations in San Diego County were unable to dispense regular-grade gasoline due to the delivery of non-compliant gasoline. The problem was caused by the failure of inline blending equipment at a truck rack that dispenses ethanol into gasoline as it is loaded into a tanker truck. The problem affected 59 of the 120 retail ARCO stations in the county. In all, 420,000 gallons were affected. These gallons had to be returned to the terminals for reblending.

Replacement of the non-compliant fuel with compliant fuel at the retail stations took approximately three days. Some stations offered premium grade fuel at the same price as regular to avoid inconveniencing customers. On that day, retail prices for San Diego dropped almost two cents from the previous day to $2.12 per gallon, indicating the problem did not impact local retail prices immediately (see Figure 14).

This type of problem had never occurred in California before since oxygenates (MTBE) were blended with gasoline at the refinery, not at the terminal. However, it appears that of the 60-plus petroleum distribution terminals in the state that installed in-line dispensing equipment to accommodate ethanol blending, this was the only failure to date that the Energy Commission is aware of and the problem has been resolved.

Figure 14



The above chart is used WITHOUT PERMISSION from CaliforniaGasPrices.com due to time constraints.

San Diego's $4.29 Gasoline Price

On March 12, 2003, while San diego gasoline prices were averaging $2.12 per gallon, a dealer operating a Texaco service station in El Cajon posted a price of $3.19 for regular gas and a price of $4.29 for premium. Though the extraordinary high prices were reported in newspapers and on local and national television, this was an isolated incident. It was not related to Arco's problem with regular gasoline.

VII. California Refiner and Dealer Margins

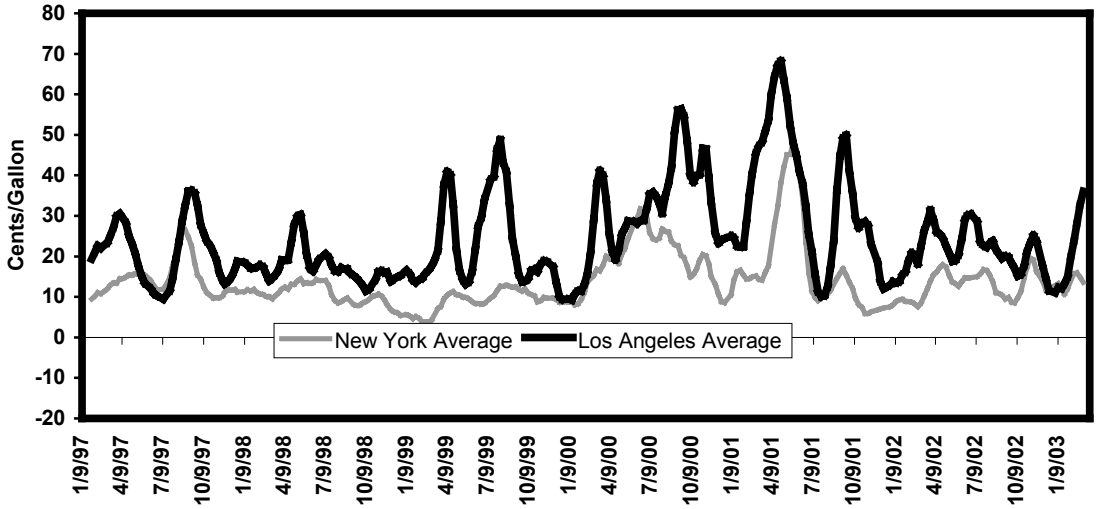
The refinery margin is the total of the cost of refining and profit margin. This report calculates refinery margin as the difference between the spot pipeline price of gasoline or diesel[20] and the average market price of crude oil.[21]

Refiner margins have increased in 2003. The seven-year average for refiner margins is between 29 to 32 cents. Since the beginning of the year, estimated refiner margins ranged from 19 cents to 76 cents per gallon of gasoline for both major and independent refiners.

Figure 15 compares California and New York refining margins for Phase 2 gasoline.

Figure 15

Refiner Margin Comparison
Los Angeles vs. New York



The refinery changeover from MTBE to ethanol could increase refiner margins because a lower volume of ethanol is used in Phase 3 gasoline than the volume of MTBE used in Phase 2 gasoline (5.7% versus 10% respectively). This increases the net volume of crude oil used to produce Phase 3 gasoline versus Phase 2 gasoline. When crude oil is less expensive than ethanol, refining margins increase slightly.

[20] The spot price is used as a proxy for the value of the fuel as it exits the refinery.
[21] In this report, Alaska North Slope crude oil prices are used as a benchmark crude oil price. Crude oil cost includes all upstream profits and costs.

Dealer margins include the costs of distributing and marketing gasoline at the retail level. The seven-year average for dealers is approximately 10 cents per gallon. Estimates show that in the past four weeks, average dealer cost and profit margins for both major brands and independent stations ranged from four cents to 18 cents a gallon. Cost and profit margins for retailers include such expenses as franchise fees, rents, wages, utilities, supplies, equipment maintenance, environmental fees, licenses, permitting fees, insurance, depreciation and advertising, as well as profit. For dealers, some expenses such as credit card fees increase as the retail price goes up.

Excise and Sales Taxes

Excise Taxes

Gasoline and diesel fuels are assessed federal and state excise taxes. The federal excise tax is 18.3 cents per gallon. However, if a gasoline falls within the definition of gasohol (it has at least 5.7% of ethanol in its blend), the federal excise tax is, instead, 15.4 cents per gallon. California's Phase 3 reformulated gasoline specification falls into this category. In addition, there is a federal fee of 0.1 cent per gallon to finance a trust fund to address leaking underground storage tanks.

California also applies an excise tax on each gallon of gasoline and further requires that the combined federal and state excise taxes shall not be less than 33 cents per gallon.

The federal excise tax on diesel fuel is 24.3 cents per gallon (with no fee for the trust fund). The state excise tax is 18 cents per gallon with the same 33-cent minimum combined total excise tax requirement.

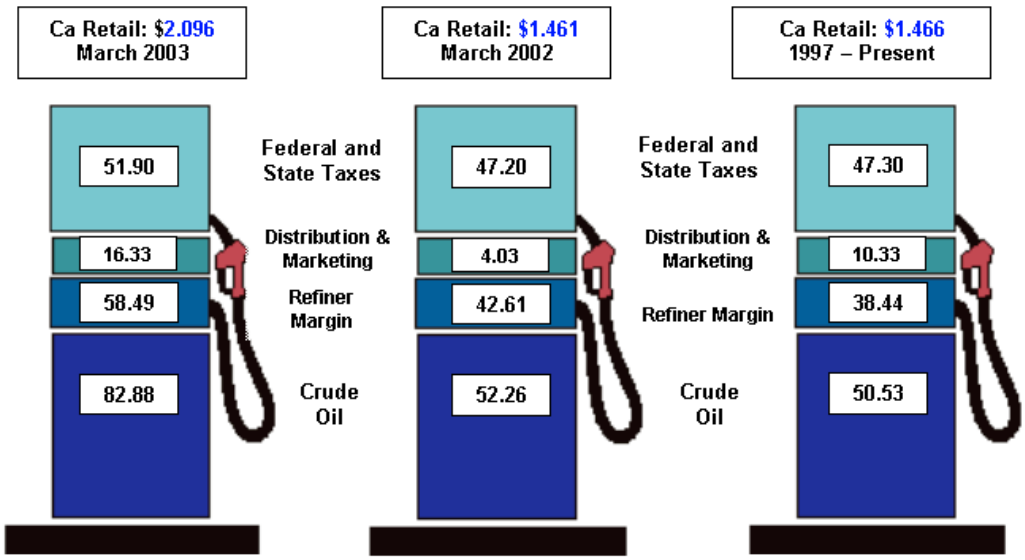
Sales Taxes

Sales tax is assessed on gasoline sold within California. Sales tax is applied on a percentage basis. The current state sales tax is 7.25 percent, of which 6 percent is the state portion and 1.25 percent is the local government portion. Many communities collect an additional local sales tax, resulting in sales taxes ranging from 7.25 percent to 8.75 percent in different areas of California. Thus, an increase in gasoline prices of 60 cents per gallon would include from 4.4 to 5.3 cents per gallon of additional state and local sales tax revenue.

Retail Petroleum Product Prices

Figures 16 – 19 are based on branded and unbranded wholesale rack MTBE-gasoline prices, Alaska North Slope crude oil prices, and EIA weekly average California retail prices.

Figure 16. Branded[22] Retail Gasoline Price Analysis

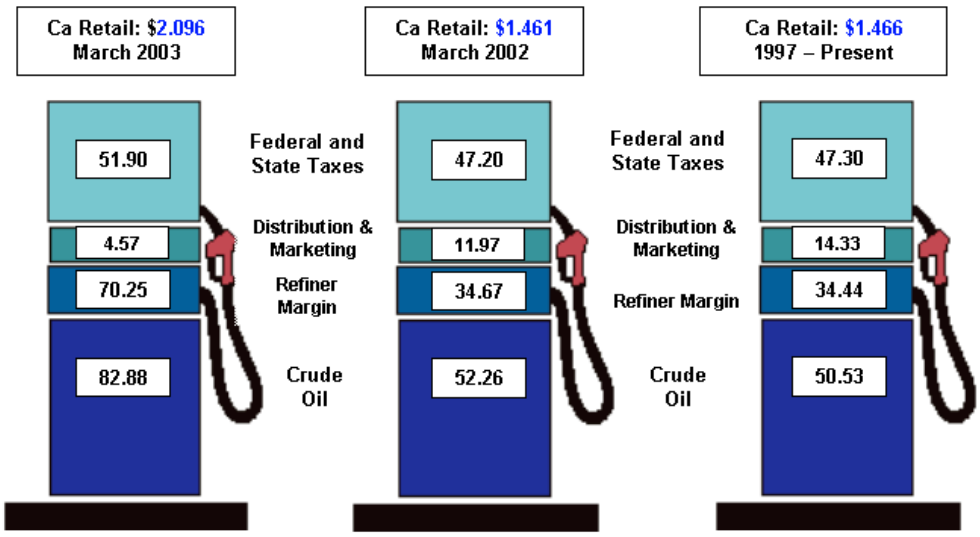


The DOE Energy Information Administration's gasoline prices released for March 2003 show California reach new all-time highs for retail gasoline. The highest retail average price (nominal dollars) for the state prior to this period was $1.95 (regular unleaded) on May 14, 2001. At the peak of the price spike on March 17 with prices at $2.15 per gallon, wholesale prices also peaked, reaching as high as $1.69 for unbranded gasoline and $1.51 for branded gasoline. With crude oil accounting for 83 cents, refinery margins peaked at over 80 cents on that particular day.

However, while wholesale prices fluctuate throughout the day and are different at any given distribution site, retail prices tend to change less frequently. Given this fact, calculating margins based on a single day may not yield accurate information reflective of a longer-term trend. Accordingly, when margins are calculated based on the average prices in both the wholesale and retail markets over an entire month, a clearer picture emerges.

[22] "Unbranded" is gasoline and diesel fuel sold for wholesale or retail distribution to consumers without proprietary additives or marketing under a brand name or trademark owned or controlled by an independent refiner or an integrated refining and marketing company. (PRC 25141) "make branded first" means gasoline and diesel fuel sold for wholesale or retail distribution to consumers with proprietary additives or marketing under a brand name or trademark.

Figure 17 Unbranded Retail Gasoline Price Analysis



Unbranded Retail Gasoline Price Analysis

The most noticeable point observed in comparing the branded and the unbranded price breakdown is the 4.5-cent "distribution and marketing" return for unbranded retail dealers compared to the 16 cent return for the branded dealer. In the case of the branded dealer, this figure may be overstated. The branded dealer typically is charged a dealer tankwagon or "DTW" price based upon the time of delivery to the retailer. These prices are often fixed for varying lengths of time and are generally higher than a branded wholesale rack price. The benefit to the dealer is that when gasoline supplies are tight, the branded stations are usually guaranteed some amount of gasoline at this DTW price and it is during these times that the DTW price can be lower than what is charged at the racks. The DTW price may be considered a form of insurance incorporated into the price to keep the retail from running out of fuel during tight supply periods.

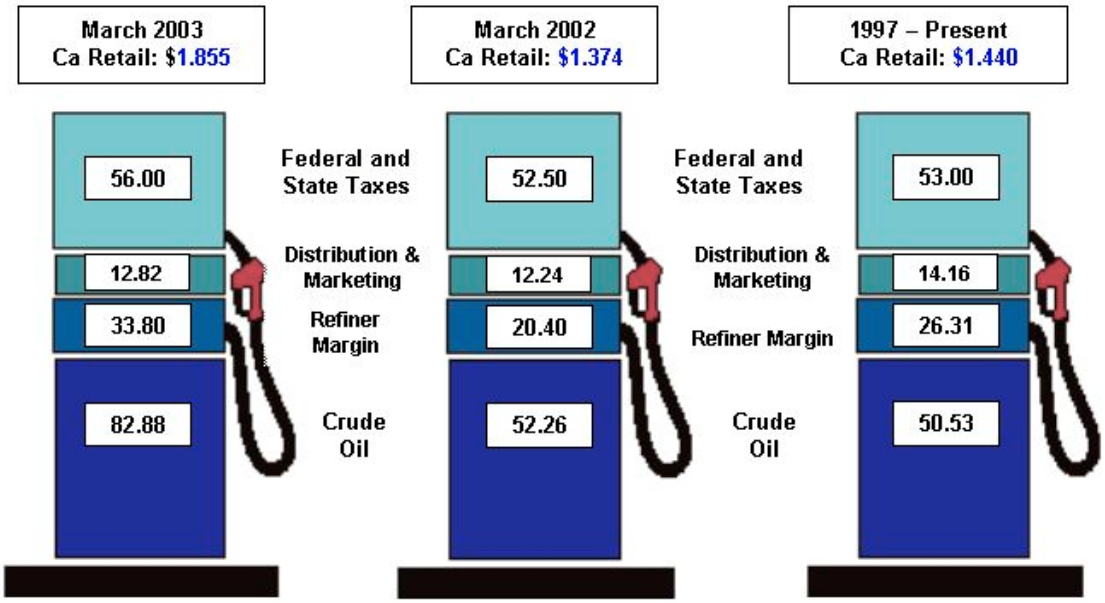
The distribution and marketing return for an unbranded dealer is significantly below the historical average. This indicates that on average independent dealers are coping with tight supply of uncontracted gasoline and may at times end up selling gasoline at a loss. If this dealer margin continues to remain very low, there may be instances where some stations choose to close their pumps until the market adjusts.

Another fact that is apparent between the two figures is how refiner margins change very quickly when crude prices drop faster than wholesale rack prices. Conversely, margins can also become exaggerated when the wholesale rack

price increases at a faster pace than crude oil prices. For March 17, 2003, Los Angeles unbranded wholesale rack prices for CaRFG were $1.67 per gallon (ex-tax). Crude oil accounted for only half of this amount, or 82 cents. The remaining amount, 85 cents per gallon, goes directly to the refiner for cost recovery and profit. Unbranded rack prices in Sacramento and San Francisco were 10 and 20 cents per gallon less, respectively. This would reduce the refiner margin by the same amount, resulting in a 75-cent-per-gallon margin in Sacramento and a 65-cent margin in San Francisco. Independent "unbranded" retail dealers are often the first to feel the pinch due to rapidly rising wholesale costs but are also the first retailers to reap the reward when fuel is readily available and wholesale price drops outpace retail price changes. Their "branded" counterparts typically face little change due to dealer tankwagon pricing contracts that generally guarantee a moderate, but steady, profit with the excess going back to the parent company.

Retail Diesel Pump Prices

Figure 18 Branded Retail Diesel Price Analysis



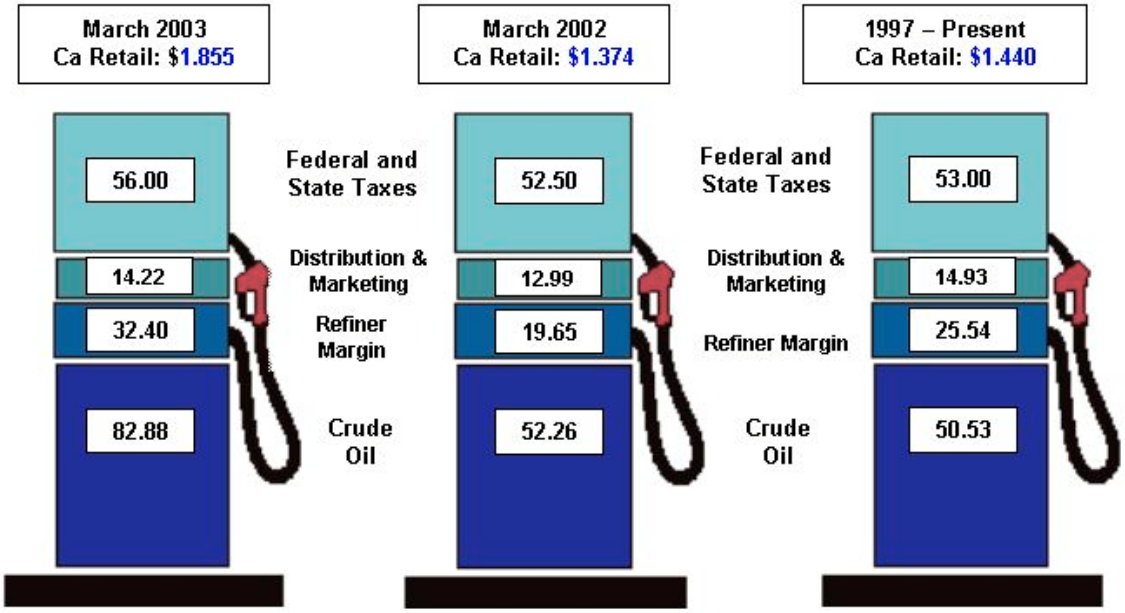
Branded Diesel Prices Analysis

The DOE Energy Information Administration's diesel statistics released for the weeks of March 2003 continue to see elevated prices for retail on-road diesel fuel. However, current prices have not reached the September 4, 2000 all time high of $1.976 per gallon.

Current retail diesel prices reflect increased crude oil costs being passed through to the consumer. Refiner margins, calculated based on branded wholesale diesel prices in Los Angeles, are generally consistent with long-term averages. Dealer margins are up slightly over the historical average. Based on these indicators, diesel fuel pricing is following historical norms with the primary portion of the recent price increase attributable to increases in crude oil.

Unbranded Diesel Price Analysis

Figure 19 Unbranded Retail Diesel Price Analysis



Unlike the gasoline market, there is little distinction between branded and unbranded diesel fuel. As the price analysis indicates, the wholesale prices generally differ by only a penny per gallon between branded and unbranded diesel. For March 2003, Los Angeles unbranded wholesale prices for on-road diesel averaged $1.153 per gallon (ex-tax). Branded diesel in Los Angeles averaged $1.167. Wholesale prices in Sacramento and San Francisco are comparable to Los Angeles prices, generally differing by no more than a few pennies. As mentioned, diesel is generally not subject to the same “branding” and marketing efforts as gasoline.

VIII. Market Manipulation, Market Power and Strategic Supply Decisions

California's gasoline market can be characterized as one of imperfect competition.[23] More specifically, at least some firms in the industry may have the ability to exercise market power to varying degrees through withholding supply to affect market price. Such an industry structure is by no means unusual: few real-world markets are perfectly competitive.[24] Note that a lack of perfect competition does not necessarily imply a market without adequate competition, nor does it imply that potential new entrants are shut out of the market.

Because gasoline is such an important and necessary commodity, the idea of firms exercising market power (whether unilaterally or collusively) raises deep concerns, especially when the market is "tight"[25] and/or when prices have already risen to unusually high levels due to other circumstances (e.g., rising world oil prices). However, if California is undergoing a price spike, that cannot be completely explained by changes in the world price of petroleum, this does not necessarily mean that any refiner is intentionally exercising market power. In the California gasoline market, a seemingly minor supply disruption can have a significant impact on price, without any refiner behaving strategically.

In addition, such behavior would pose risks for a refiner acting independently. First, the refiner could permanently lose market share. Second, the increase in price brought about by supply reduction might not be enough to compensate for the loss in physical sales (although other refiners would certainly profit). The incentive to exercise unilateral market power in a tight market may be outweighed by these risks.

Many previous investigations and reports, including one by the California Attorney General's office in May 2000, have looked into the possibility that refiners have been involved in collusion. In all, no evidence of explicit (unlawful) collusion was found. However, tacit collusion[26] is still a possibility. This discussion so far has addressed refiner behavior when market conditions are tight, and not the circumstances that led to the market being tight in the first place. Tacit collusion, which is most effective when the level of competition is relatively low, could be a contributing factor to the tightness of the market. Therefore, more competition (and thus less possibility of tacit collusion) may

[23] As opposed to perfect competition, characterized by numerous relatively small firms that are "price takers"—the output decisions of an individual firm will have a negligible impact on market price.
[24] The best candidates for perfect competition are probably certain agricultural markets.
[25] "Tight" in this case refers to a case where refiners are operating very close to full capacity while discretionary (non-operational) inventory levels are relatively low.
[26] Tacit collusion refers to a case where firms are able to "coordinate" their activities simply by observing and anticipating the behavior of their rivals.

reduce the sensitivity of the market to small supply disruptions. Competition in the California gasoline market is being explored more fully in an Energy Commission report due to be released this summer, a report that examines strategies to reduce gasoline price volatility.

At this point, the Energy Commission has no evidence to claim that any refiners are exercising market power, individually or in concert, or to claim that this behavior has exacerbated California's recent gasoline price increases.